Annual On-Site Construction Equipment Emissions

Source	Maximum Emissions (tpy)[1] CO	ROC	NOx	SOx	PM10
Onsite Construction Equipment	11.28	2.05	17.66	1.49	1.08

[1] Maximum emissions occur during quarters 3 through 6.

PM10 Fugitive Emissions From Construction

Plant Construction Site - Demolition Month 1 (D1) Only

1.5	Acres Graded Surface x	26.4	lbs/day PM10 =	6.6	lb/day PM10 *
				0.8	lb/hour PM10 *
				143	lb/mo PM10 *
				0.07	ton/mo PM10 *

Plant Construction Site - Demolition Month 2 (D2) Through Construction Month 15 Only

3.1	Acres Graded Surface x	26.4	lbs/day PM10 =	13.6	lb/day PM10 *		
				1.7	lb/hour PM10 *		
				296	lb/mo PM10 *	887	lb/quarter PM10 *
				0.15	ton/mo PM10 *	0.44	tons/quarter PM10 *

Plant Construction Site - Month 16 Only

2.5	Acres Graded Surface x	26.4	lbs/day PM10 =	11	lb/day PM10 *
				1.375	lb/hour PM10 *
				238	lb/mo PM10 *
				0.12	ton/mo PM10 *

Plant Construction Site - Month 17 Only

1.50	Acres Graded Surface x	26.4	lbs/day PM10 =	6.6	lb/day PM10 *
				0.8	lb/hour PM10 *
				143	lb/mo PM10 *
				0.07	ton/mo PM10 *

Plant Construction Site - Month 18 Only

0.5	Acres Graded Surface x	26.4	lbs/day PM10 =	2.2	lb/day PM10 *
				0.3	lb/hour PM10 *
				48	lb/mo PM10 *
				0.02	ton/mo PM10 *

TOTAL PROJECT PM10 EMISSIONS:	**5301 lbs**
(i.e., Total for Phases I and II of Project)	**2.7 tons**

Lbs/Day PM10 emission factor is from the South Coast Air Quality Management District (SCAQMD) *CEQA Air Quality Handbook (1993)*, "Information for PM10 Emissions From Fugitive Dust Created During Construction and Operation of the Project", Table A9-9, for emissions from graded surfaces.

* 50% Control Efficiency of dust due to watering of construction area.

Quarterly Const. Emissions = lb/hr * 8hr/day * (52wk/yr.) * (5dys/wk]) *(yr/4qtr).

Fugitive dust emissions assume 8 work hours per day, 5 days per week.

Magnolia Power Project Construction Site Modeled Emissions

CONSTRUCTION EQUIPMENT	NO_x		CO		PM_{10}		SO_2	
	(lb/hr)	(g/s) [1]	(lb/hr)	(g/s) [1]	(lb/hr)	(g/s) [1]	(lb/hr)	(g/s) [1]
Mos. D1 - 23 Construction Emissions - Plant Site								
Maximum Hourly	21.77	2.7430	14.93	1.8812	----	----	1.84	0.2318
Maximum 3-Hour [2]	----	----	----	----	----	----	1.84	0.2318
Maximum 8-Hour [2]	----	----	14.93	1.8812	----	----	----	----
Maximum 24-Hour [3]	----	----	----	----	0.44	0.0555	0.61	0.0772
Annual [4]	4.03	0.5080	----	----	0.2466	0.0311	0.3402	0.0429

FUGITIVE DUST		
Annual Construction Dust (PM10) Emissions - Plant Construction Site		
Maximum 24-Hour [3]	0.5683	0.0716
Maximum Annual Average	0.4048	0.0510

[1] Grams per second (g/s) = lbs/hr * 0.126

[2] 3-hour Lbs/Hr and 8-hour Lbs/Hr = Maximum Lbs/Hr

[3] 24-hour lbs/hr = Maximum daily PM_{10} emissions (lb/day) divided by 24 hours.

[4] Annual Construction Equipment lbs/hr = Annual emissions (tpy) * (2000 hrs/yr) * (1 yr/8760 hours).

Operating Scenarios

	Hours Per Event	Events Per Year	Hours Per Year	Maximum Hours Per Day
Non-Duct Firing	- -	- -	7083	24
Duct Firing	- -	- -	1000	12
Startups				
Hot Starts	1.5	52	78	1.5
Warm Starts	2.1	52	109.2	2.1
Shutdowns	0.5	104	52	0.5
Boiler	3	52	156	3

Annual NOx

Worst case scenario includes duct firing (1000 hrs), full starts/shutdowns (104 of each), and full non-duct firing hours (7,083 hrs)
Worst case annual NOx impacts occur using the Westinghouse turbine alternative for both duct fired and non-duct fired (Scen3SI, and Scen2, respectively).

	Number of Events	lb NOx/event	Total NOx (lbs)	Category Mass Totals (lbs)	Hours Per Year (hrs)	Category Hour Totals (hrs)	Base Hourly Emission Rate (lb/hr)	Modeled Mass Emission Rate (g/s)
Startups								
Hot Start	52	34.5	1,794		78			
Warm Start	52	48	2,496		109.2			
Shutdowns	104	25	2,600		52			
				6,890		239.2	28.80434783	0.09910274

Stack Parameters for Startup/Shutdown Turbine
Screening modeling indicates that the worst-case X/Q (dispersion) result is for the GE turbine alternative Scenario 6 (45% load, 41 F).

Exhaust Temperature	353.24 K
Exit Velocity	11.35 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total NOx (lbs)	Modeled Mass Emission Rate (g/s)
Duct Firing	1,000	18.05	18,054.02	0.260

Stack Parameters for Duct Fired Turbine

Exhaust Temperature	358.74 K
Exit Velocity	18.45 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total NOx (lbs)	Modeled Mass Emission Rate (g/s)
Non-Duct Firing	7,083	13.70	97,037.10	1.396

Stack Parameters for Non-Duct Fired Turbine

Exhaust Temperature	365.85 K
Exit Velocity	19.01 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total NOx (lbs)	Modeled Mass Emission Rate (g/s)
Auxiliary Boiler	156	0.224	34.944	0.000502619

Stack Parameters for Auxiliary Boiler

Exhaust Temperature	477.59 K
Exit Velocity	30.48 m/s

Annual SO2

Worst case scenario includes duct firing (1000 hrs), full starts/shutdowns (104 of each), and full non-duct firing hours (7,083 hrs)
SO2 emission rates for startup/shutdown are based on the maximum non-duct fired SO2 mass emission rate (Westinghouse Scenario 4)
Worst case annual SO2 impacts occur using the Westinghouse turbine alternative for both duct fired and non-duct fired (Scen3SI, and Scen2, respectively).

	Number of Events	lb SO2/event	Total SO2 (lbs)	Category Mass Totals (lbs)	Hours Per Year (hrs)	Category Hour Totals (hrs)	Base Hourly Emission Rate (lb/hr)	Modeled Mass Emission Rate (g/s)
Startups								
Hot Start	52	1.68	87		78			
Warm Start	52	2.352	122		109.2			
Shutdowns	104	0.56	58		52			
				268		239.2	1.12	0.003853414

Stack Parameters for Startup/Shutdown Turbine
Screening modeling indicates that the worst-case X/Q (dispersion) result is for the GE turbine alternative Scenario 6 (45% load, 41 F).

Exhaust Temperature	353.24 K
Exit Velocity	11.35 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total SO2 (lbs)	Modeled Mass Emission Rate (g/s)
Duct Firing	1,000	1.47	1,470.00	0.021

Stack Parameters for Duct Fired Turbine

Exhaust Temperature	358.74 K
Exit Velocity	18.45 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total SO2 (lbs)	Modeled Mass Emission Rate (g/s)
Non-Duct Firing	7,083	1.12	7,932.96	0.114

Stack Parameters for Non-Duct Fired Turbine

Exhaust Temperature	365.85 K
Exit Velocity	19.01 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total SO2 (lbs)	Modeled Mass Emission Rate (g/s)
Auxiliary Boiler	156	0.0036	0.5616	8.07781E-06

Stack Parameters for Auxiliary Boiler

Exhaust Temperature	477.59 K
Exit Velocity	30.48 m/s

Annual PM10 - Westinghouse Turbine Alternative

Worst case scenario includes duct firing (1000 hrs), full starts/shutdowns (104 of each), and full non-duct firing hours (7,083 hrs)
Worst case annual PM10 impacts occur using the Westinghouse turbine alternative for both duct fired and non-duct fired (Scen3SI, and Scen2, respectively).

	Number of Events	lb PM10/event	Total PM10 (lbs)	Category Mass Totals (lbs)	Hours Per Year (hrs)	Category Hour Totals (hrs)	Base Hourly Emission Rate (lb/hr)	Modeled Mass Emission Rate (g/s)
Startups								
Hot Start	52	18	936		78			
Warm Start	52	25	1,300		109.2			
Shutdowns	104	9	936		52			
				3,172		239.2	13.26086957	0.045624658

Stack Parameters for Startup/Shutdown Turbine
Screening modeling indicates that the worst-case X/Q (dispersion) result is for the GE turbine alternative Scenario 6 (45% load, 41 F).

Exhaust Temperature	353.24 K
Exit Velocity	11.35 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total PM10 (lbs)	Modeled Mass Emission Rate (g/s)
Duct Firing	1,000	18.00	18,000.00	0.259

Stack Parameters for Duct Fired Turbine

Exhaust Temperature	358.74 K
Exit Velocity	18.45 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total PM10 (lbs)	Modeled Mass Emission Rate (g/s)
Non-Duct Firing	7,083	12.00	84,996.00	1.223

Stack Parameters for Non-Duct Fired Turbine

Exhaust Temperature	365.85 K
Exit Velocity	19.01 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total PM10 (lbs)	Modeled Mass Emission Rate (g/s)
Auxiliary Boiler	156	0.0310	4.836	6.95589E-05

Stack Parameters for Auxiliary Boiler

Exhaust Temperature	477.59 K
Exit Velocity	30.48 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total PM10 (lbs)	Modeled Mass Emission Rate (g/s)
Cooling Tower (per cell)	8,760	0.0503	440.8032	0.00634032
		Tower Total	2,644.82	

Stack Parameters for Cooling Tower Cells

Exhaust Temperature	304.35 K
Exit Velocity	8.43 m/s

Annual PM10 - GE Turbine Alternative

Worst case scenario includes duct firing (1000 hrs), full starts/shutdowns (104 of each), and full non-duct firing hours (7,083 hrs)
Worst case annual PM10 impacts occur using the GE turbine alternative for both duct fired and non-duct fired (Scen8SI, and Scen4, respectively).

	Number of Events	lb PM10/event	Total PM10 (lbs)	Category Mass Totals (lbs)	Hours Per Year (hrs)	Category Hour Totals (hrs)	Base Hourly Emission Rate (lb/hr)	Modeled Mass Emission Rate (g/s)
Startups								
Hot Start	52	18	936		78			
Warm Start	52	25	1,300		109.2			
Shutdowns	104	9	936		52			
				3,172		239.2	13.26086957	0.045624658

Stack Parameters for Startup/Shutdown Turbine
Screening modeling indicates that the worst-case X/Q (dispersion) result is for the GE turbine alternative Scenario 6 (45% load, 41 F).

Exhaust Temperature	353.24 K
Exit Velocity	11.35 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total PM10 (lbs)	Modeled Mass Emission Rate (g/s)
Duct Firing	1,000	18.00	18,000.00	0.259

Stack Parameters for Duct Fired Turbine

Exhaust Temperature	360.18 K
Exit Velocity	18.26 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total PM10 (lbs)	Modeled Mass Emission Rate (g/s)
Non-Duct Firing	7,083	12.00	84,996.00	1.223

Stack Parameters for Non-Duct Fired Turbine

Exhaust Temperature	364.62 K
Exit Velocity	18.42 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total PM10 (lbs)	Modeled Mass Emission Rate (g/s)
Auxiliary Boiler	156	0.0310	4.836	6.95589E-05

Stack Parameters for Auxiliary Boiler

Exhaust Temperature	477.59 K
Exit Velocity	30.48 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total PM10 (lbs)	Modeled Mass Emission Rate (g/s)
Cooling Tower (per cell)	8,760	0.0503	440.8032	0.00634032
		Tower Total	2,644.82	

Stack Parameters for Cooling Tower Cells

Exhaust Temperature	304.35 K
Exit Velocity	8.43 m/s

1-Hour NOx

Worst case scenario includes 1st hour of a warm start.

		Number of Events	lb NOx/event (1st Hour)	Total NOx (lbs)	Modeled Mass Emission Rate (g/s)
Startups					
	Hot Start	1	23	23	2.898

Stack Parameters for Startup/Shutdown Turbine

Screening modeling indicates that the worst-case X/Q (dispersion) result is for the GE turbine alternative Scenario 6 (45% load, 41 F).

Exhaust Temperature	353.24 K
Exit Velocity	11.35 m/s

1-Hour CO

Worst case scenario includes 1st hour of a warm start.

		Number of Events	lb CO/event (1st Hour)	Total CO (lbs)	Modeled Mass Emission Rate (g/s)
Startups					
	Hot Start	1	285	285	35.91

Stack Parameters for Startup/Shutdown Turbine

Screening modeling indicates that the worst-case X/Q (dispersion) result is for the GE turbine alternative Scenario 6 (45% load, 41 F).

Exhaust Temperature	353.24 K
Exit Velocity	11.35 m/s

8-Hour CO

Worst case scenario includes 1 warm start and the remaining hours under duct firing.

Worst case 1 hour impacts occur using the Westinghouse turbine alternative for duct firinig (Scen3SI).

		Number of Events	lb CO/event	Total CO (lbs)	Hours Per Averaging Period (hrs)	Modeled Mass Emission Rate (g/s)
Startups						
	Hot Start	1	428	428	1.5	6.741

Stack Parameters for Startup/Shutdown Turbine

Screening modeling indicates that the worst-case X/Q (dispersion) result is for the GE turbine alternative Scenario 6 (45% load, 41 F).

Exhaust Temperature	353.24 K
Exit Velocity	11.35 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total NOx (lbs)	Modeled Mass Emission Rate (g/s)
Duct Firing	6.5	32.97	214.33	3.376

Stack Parameters for Duct Fired Turbine

Exhaust Temperature	358.74 K
Exit Velocity	18.45 m/s

1- & 3-Hour SO2

Worst case scenario is duct firing.
Worst case 1- and 3-hour SO2 impacts occur using the Westinghouse turbine alternative (Scen3SI).

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	ed Mass Emission Rate (g/s)
Duct Firing	1 & 3	1.47	0.185

Stack Parameters for Duct Fired Turbine

Exhaust Temperature	358.74 K
Exit Velocity	18.45 m/s

24-Hour PM10 - Westinghouse Turbine Alternative

Worst case scenario includes 1 warm start, 12 hours of duct firing 12 hrs, and 10 non-duct firing hours.
Worst case 24-hour PM10 impacts occur using the Westinghouse turbine alternative for both duct fired and non-duct fired (Scen3SI, and Scen2, respectively).

	Number of Events	lb PM10/event	Total PM10 (lbs)	Hours Per Averaging Period (hrs)	Modeled Mass Emission Rate (g/s)
Startups					
Warm Starts	1	25	25.000	2.1	0.13125

Stack Parameters for Startup/Shutdown Turbine
Screening modeling indicates that the worst-case X/Q (dispersion) result is for the GE turbine alternative Scenario 6 (45% load, 41 F).

Exhaust Temperature	353.24 K
Exit Velocity	11.35 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total PM10 (lbs)	Modeled Mass Emission Rate (g/s)
Duct Firing	12	18.00	216.00	1.134

Stack Parameters for Duct Fired Turbine

Exhaust Temperature	358.74 K
Exit Velocity	18.45 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total PM10 (lbs)	Modeled Mass Emission Rate (g/s)
Non-Duct Firing	9.9	12.00	118.80	0.624

Stack Parameters for Non-Duct Fired Turbine

Exhaust Temperature	365.85 K
Exit Velocity	19.01 m/s

24-Hour PM10 - GE Turbine Alternative

Worst case scenario includes 1 warm start, 12 hours of duct firing 12 hrs, and 10 non-duct firing hours.
Worst case 24-hour PM10 impacts occur using the Westinghouse turbine alternative for both duct fired and non-duct fired (Scen8SI, and Scen4, respectively).

	Number of Events	lb PM10/event	Total PM10 (lbs)	Hours Per Averaging Period (hrs)	Modeled Mass Emission Rate (g/s)
Startups					
Warm Starts	1	25	25.000	2.1	0.13125

Stack Parameters for Startup/Shutdown Turbine
Screening modeling indicates that the worst-case X/Q (dispersion) result is for the GE turbine alternative Scenario 6 (45% load, 41 F).

Exhaust Temperature	353.24 K
Exit Velocity	11.35 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total PM10 (lbs)	Modeled Mass Emission Rate (g/s)
Duct Firing	12	18.00	216.00	1.134

Stack Parameters for Duct Fired Turbine

Exhaust Temperature	360.18 K
Exit Velocity	18.26 m/s

	Hours of Operation (hrs)	Base Hourly Emission Rate (lb/hr)	Total PM10 (lbs)	Modeled Mass Emission Rate (g/s)
Non-Duct Firing	9.9	12.00	118.80	0.624

Stack Parameters for Non-Duct Fired Turbine

Exhaust Temperature	364.62 K
Exit Velocity	18.42 m/s

Appendix H.4

Auxiliary Boiler Emissions

Emission Estimates				
NO_X[1]	CO[1]	VOC[1]	SO_2[2]	PM_{10}[3]
0.224	0.221	0.020	0.0036	0.031

Emissions calculated as lb/hr @ 3% O_2.

Heat Input:	6.13	MMBtu/hr
Heating Value:	1012	MMBtu/scf

	SO_2[2]		PM_{10}[3]
lb/MMscf	0.60	lb/MMBtu	0.005
MMscf/hr	0.0061	----	----
lb/hr	0.0036	lb/hr	0.03065

[1] Emissions supplied by Black & Veach.

[2] USEPA Compilation of Air Pollutant Emission Factors: AP-42, Fifth Edition, Volume I: Stationary Sources & Supplements

[3] Emission factor provided by Black & Veach.

Appendix H.4

PM_{10} Emissions from the Cooling Tower

<u>PM_{10} 24-hr</u>

Cooling Tower

From water quality data (attached), cooling tower blowdown (TSS + TDS)
TSS = 15 mg/L
TDS = 950 mg/L
Total solids = 965 mg/L (TS)
Controlled Drift Rate = 900 gal/day
Drift eliminator Efficiency = 0.0006%
Cooling Tower comprises 6 cells total

PM_{10} Emissions:

$$\frac{900\text{ gal drift}}{\text{day}} \times \frac{1\text{ L drift}}{0.26417\text{ gal drift}} \times \frac{965\text{ mg TS}}{\text{L drift}} \times \frac{1\text{ g TS}}{1000\text{ mg TS}} \times \frac{1\text{ day}}{86{,}400\text{ sec}}$$

⇒ 0.03805 g/s PM_{10}

⇒ 0.00634 g/s per cooling tower cell.

Appendix H-4

		Cool. Twr. Blowdown	Oil/Water Sep. Eff.	Uncontamin. Precipitation	Combined Wastewater	Discharge Limits
Flow, kgpd	Units	3,627	11	25	3,663	
Ca	mg/l	230	152	0	228	-
Mg	mg/l	119	59	0	118	-
Na	mg/l	372	95	0	369	-
K	mg/l	29	4	0	29	-
M.Alk as CaCO3	mg/l	395	182	10	392	-
Cl	mg/l	179	47	0	177	190
SO_4	mg/l	161	63	0	160	300
NO_3	mg/l	3	17	0	3	-
Cl_2	mg/l	0	-	0.0	0.2	0.2
SiO_2	mg/l	27	17	0	27	-
TSS	mg/l	15	0	0	15	15
TDS	mg/l	950	0	10	941	950
Inhibitor	mg/l	53	-	0	53	-
Fe	mg/l	0.085	-	0	0.084	0.300
Cu	mg/l	0.01158	-	0.00000	0.01146	0.011
Al as Al_2O_3	mg/l	0.003	0	0	0.003	1
PO_4	mg/l	0.0	-	0	0	5
pH	S.U.	6.5 to 9	10	6.5	6.5 to 9	6.5 to 9.0
Conductivity	µS/cm	1,200	600	10	(2)	-
CT BD below = 1.5 * PWD Monthly Monitoring Report Value, Discharge 002, except < values are shown						
Turbidity	NTU	-	-	-	< 3	2
Temperature	°F	65 to 82	-	-	100	100
BOD_5	mg/l	12	-	-	12	20
O/G	mg/l	< 2	-	-	< 2	10
Settlable Solids, SS	mg/l	(2)	(2)	(2)	-	0.1
CN	mg/l	< 0.02	-	-	< 0.02	5.2
S	mg/l	-	-	-	-	-
B	mg/l	1.5	-	-	1.5	1.5
F	mg/l	0.8	-	-	0.7	2.0
Det, MBAS	mg/l	0.3	-	-	0.3	0.5
NO_2-N	mg/l	0.9	-	-	0.9	1
NO_2-N+NO_3-N	mg/l	6	-	-	6	8
NH_3	mg/l	27	-	-	27	10
organic-N	mg/l	< 2.5	-	-	< 2.5	-
Ba	mg/l	< 0.15	-	-	< 0.15	1.0
Mn	mg/l	0.027	-	-	0.027	0.050
As	mg/l	0.003	-	-	0.003	0.050
Cd	mg/l	< 0.010	-	-	< 0.010	0.001
Cr	mg/l	< 0.010	-	-	< 0.010	0.2
Pb	mg/l	< 0.050	-	-	< 0.050	0.0025
Hg	mg/l	< 0.0002	-	-	< 0.0002	0.000012
Ni	mg/l	< 0.010	-	-	< 0.010	0.001
Se	mg/l	< 0.002	-	-	< 0.002	0.005
Ag	mg/l	< 0.050	-	-	< 0.050	0.0034
Zn	mg/l	0.131	-	-	0.131	1
Co	mg/l	< 0.050	-	-	< 0.050	-
PCB	mg/l	< 0.0002	-	-	< 0.0002	None
Endrin	mg/l	< 0.000005	-	-	< 0.000005	0.0000023
Lindane	mg/l	< 0.000005	-	-	< 0.000005	0.0001
1,4-dichlorobenzene	mg/l	< 0.003	-	-	< 0.003	0.005
Bis(2-ethylhexyl)-phthalate	mg/l	0.086	-	-	0.085	0.004
1,2-dichloroethane	mg/l	< 0.0005	-	-	< 0.0005	0.0005
Chloroform	mg/l	0.007	-	-	0.007	0.100
Ethylbenzene	mg/l	< 0.0005	-	-	< 0.0005	0.700
Toluene	mg/l	< 0.0005	-	-	< 0.0005	0.150
Tetrachloroethylene	mg/l	< 0.0005	-	-	< 0.0005	0.005
Methylene chloride	mg/l	< 0.003	-	-	< 0.003	0.005
Bromoform	mg/l	< 0.001	-	-	< 0.001	0.100
Bromodichloromethane	mg/l	< 0.0005	-	-	< 0.0005	0.100
Dichlorobromomethane	mg/l	< 0.0005	-	-	< 0.0005	0.100
2,4-D	mg/l	< 0.0004	-	-	< 0.0004	0.070
2,4,5-TP Silvex	mg/l	< 0.00002	-	-	< 0.00002	0.010
Nitorbenzene	mg/l	-	-	-	-	-
2,4-chlorophenol	mg/l	-	-	-	-	-
Phenol	mg/l	0.030	-	-	0.030	-
Methoxychlor	mg/l	< 0.000005	-	-	< 0.000005	-
MTBE	mg/l	0.0015	-	-	0.0015	-
DDT	mg/l	< 0.000005	-	-	< 0.000005	-
PAH	mg/l	< 0.004	-	-	< 0.004	-
Remaining Priority Polutants	mg/l	-	-	-	PQL(1)	None Detect.

APPENDIX H.5
EXISTING SOURCE EMISSIONS AND MODEL INPUT DATA

Summary of Activities and Emissions for Olive 1 Boiler

Date	Hours of Operation	Net Energy (MWH)	Fuel Usage (MCF)	Aux. Fuel (MCF)	Total Fuel (MCF)	NOx Emitted (lbs)	SO_2 Emitted (lbs)	CO_2 Emitted (lbs)	CO Emitted* (lbs)	PM_{10}* (lbs)
1/1/96	25	0	549.7	0.0	549.7	94.5	0.3	33.9	46.2	4.2
2/1/96	5	0	88.4	0.0	88.4	17.1	0.1	5.4	7.4	0.7
3/1/96	7	0	142.1	0.0	142.1	219.2	0.1	8.8	11.9	1.1
4/1/96	21	0	438.4	0.0	438.4	1,613.4	0.3	27.0	36.8	3.3
5/1/96	47	21	1,463.1	0.0	1,463.1	1,750.1	0.9	89.5	122.9	11.1
6/1/96	205	1761	25,806.1	0.0	25,806.1	3,123.3	15.9	1,571.0	2,167.7	196.1
7/1/96	397	3697	52,211.9	0.0	52,211.9	5,713.5	32.1	3,177.3	4,385.8	396.8
8/1/96	484	5744	76,683.1	0.0	76,683.1	6,996.4	47.5	4,703.0	6,441.4	582.8
9/1/96	720	6812	98,700.5	0.0	98,700.5	8,112.3	61.1	6,053.3	8,290.8	750.1
10/1/96	745	6376	94,046.0	0.0	94,046.0	8,755.0	57.7	5,714.2	7,899.9	714.7
11/1/96	19	41	886.2	0.0	886.2	1,597.8	0.5	53.8	74.4	6.7
12/1/96	25	0	549.7	0.0	549.7	1,708.2	0.3	33.3	46.2	4.2
Total Annual	2700	24452	351,565.1	0.0		39,700.6	216.8	21,470.5	29,531.5	2,671.9
					Annual Emissions, tons/year:	19.85	0.11	10.74	14.77	1.34

Date	Hours of Operation	Net Energy (MWH)	Fuel Usage (MCF)	Aux. Fuel (MCF)	Total Fuel (MCF)	NOx Emitted (lbs)	SO_2 Emitted (lbs)	CO_2 Emitted (lbs)	CO Emitted* (lbs)	PM_{10}* (lbs)
1/1/97	20	0	461.6	0.0	461.6	1,694.8	0.3	27.9	38.8	3.5
2/1/97	23	0	481.4	221.1	702.5	1,056.1	0.3	29.1	59.0	5.3
3/1/97	0	0	0.0	162.3	162.3	24.1	0.0	0.0	13.6	1.2
4/1/97	6	0	134.8	756.0	890.9	126.0	0.1	8.1	74.8	6.8
5/1/97	290	3366	45,632.9	481.5	46,114.4	3,564.3	27.8	2,755.6	3,873.6	350.5
6/1/97	720	6805	98,954.0	0.0	98,954.0	7,873.7	60.3	5,974.8	8,312.1	752.1
7/1/97	744	6431	96,540.5	0.0	96,540.5	8,280.7	58.6	5,801.6	8,109.4	733.7
8/1/97	744	9570	128,990.4	0.0	128,990.4	11,395.4	78.2	7,744.2	10,835.2	980.3
9/1/97	720	10710	139,007.6	0.0	139,007.6	12,161.4	84.4	8,358.1	11,676.6	1,056.5
10/1/97	662	6116	88,128.7	33.7	88,162.3	7,751.0	53.5	5,296.0	7,405.6	670.0
11/1/97	0	0	0.0	759.5	759.5	112.9	0.0	0.0	63.8	5.8
12/1/97	241	4076	48,885.8	519.2	49,405.1	4,785.6	30.1	2,984.3	4,150.0	375.5
Total Annual	4170	47074	647,217.7	2,933.4		58,826.2	393.5	38,979.8	54,612.7	4,941.1
					Annual Emissions, tons/year:	29.41	0.20	19.49	27.31	2.47

Summary of Activities and Emissions for Olive 1 Boiler

Date	Hours of Operation	Net Energy (MWH)	Fuel Usage (MCF)	Aux. Fuel (MCF)	Total Fuel (MCF)	NOx Emitted (lbs)	SO_2 Emitted (lbs)	CO_2 Emitted (lbs)	CO Emitted* (lbs)	PM_{10}* (lbs)
1/1/98	33	272	3,932.5	664.4	4,596.9	451.0	2.4	240.0	386.1	34.9
2/1/98	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3/1/98	0	0	0.0	473.6	473.6	70.4	0.0	0.0	39.8	3.6
4/1/98	1	0	20.0	728.2	748.2	119.2	0.0	1.2	62.8	5.7
5/1/98	4	0	144.0	736.2	880.2	142.4	0.1	8.8	73.9	6.7
6/1/98	4	0	115.6	736.2	851.8	153.8	0.1	7.1	71.6	6.5
7/1/98	455	6916	87,924.2	300.8	88,225.0	9,124.5	53.5	5,298.4	7,410.9	670.5
8/1/98	744	9807	130,482.4	0.0	130,482.4	13,414.9	80.0	7,919.9	10,960.5	991.7
9/1/98	720	8237	112,419.5	0.0	112,419.5	11,013.8	68.7	6,806.6	9,443.2	854.4
10/1/98	203	1442	22,312.3	538.2	22,850.5	2,469.5	13.6	1,351.0	1,919.4	173.7
11/1/98	0	0	0.0	750.2	750.2	111.5	0.0	0.0	63.0	5.7
12/1/98	0	0	0.0	780.7	780.7	116.1	0.0	0.0	65.6	5.9
Total Annual	**2164**	**26674**	**357,350.5**	**5,708.6**		**37,187.0**	**218.4**	**21,632.9**	**30,497.0**	**2,759.2**
			Annual Emissions, tons/year:			**18.59**	**0.11**	**10.82**	**15.25**	**1.38**

Date	Hours of Operation	Net Energy (MWH)	Fuel Usage (MCF)	Aux. Fuel (MCF)	Total Fuel (MCF)	NOx Emitted (lbs)	SO_2 Emitted (lbs)	CO_2 Emitted (lbs)	CO Emitted* (lbs)	PM_{10}* (lbs)
1/1/99	0	0	0.0	747.6	747.6	111.2	0.0	0.0	62.8	5.7
2/1/99	3	0	96.9	56.2	153.1	.	0.1	5.9	12.9	1.2
3/1/99	0	0	0.0	748.2	748.2	111.2	0.0	0.0	62.8	5.7
4/1/99	5	0	96.1	744.1	840.2	141.5	0.1	5.8	70.6	6.4
5/1/99	5	0	103.4	768.4	871.9	146.7	0.1	6.3	73.2	6.6
6/1/99	3	0	90.6	743.0	833.6	128.2	0.1	5.5	70.0	6.3
7/1/99	712	6615	95,772.3	33.4	95,805.7	8,227.3	58.8	5,828.3	8,047.7	728.1
8/1/99	744	8318	112,930.5	0.0	112,930.5	9,520.1	69.4	6,872.4	9,486.2	858.3
9/1/99	464	3135	50,900.6	127.2	51,027.8	4,469.8	31.3	3,097.5	4,286.3	387.8
10/1/99	546	6723	89,814.6	167.3	89,981.9	9,686.8	55.2	5,465.4	7,558.5	683.9
11/1/99	58	233	4,223.8	680.3	4,904.1	648.0	2.6	253.5	411.9	37.3
12/1/99	507	3656	56,156.8	214.0	56,370.7	5,950.2	34.0	3,370.7	4,735.1	428.4
Total Annual	**3047**	**28679**	**410,185.5**	**5,029.6**		**39,140.9**	**251.5**	**24,911.4**	**34,878.1**	**3,155.6**
			Annual Emissions, tons/year:			**19.57**	**0.13**	**12.46**	**17.44**	**1.58**

Summary of Activities and Emissions for Olive 1 Boiler

Date	Hours of Operation	Net Energy (kWh)	Fuel Usage (MCF)	Aux. Fuel (MCF)	Total Fuel (MCF)	NOx Emitted (lbs)	SO_2 Emitted (lbs)	CO_2 Emitted (lbs)	CO Emitted* (lbs)	PM_{10}* (lbs)
1/1/00	441	3335	50,277.5	295.6	50,573.1	5,408.5	30.5	3,017.8	4,248.1	384.4
2/1/00	0	0	0.0	242.2	242.2	36.0	0.0	0.0	20.3	1.8
3/1/00	4	0	81.6	554.0	635.6	113.9	0.0	4.9	53.4	4.8
4/1/00	11	0	210.8	742.5	953.3	167.8	0.1	12.7	80.1	7.2
5/1/00	727	7976	104,997.8	28.3	105,026.2	11,185.0	64.1	6,345.9	8,822.2	798.2
6/1/00	720	10099	129,180.0	0.0	129,180.0	13,766.4	78.7	7,795.5	10,851.1	981.8
7/1/00	744	8628	117,664.5	0.0	117,664.5	12,449.4	71.5	7,079.4	9,883.8	894.3
8/1/00	744	13257	164,990.9	0.0	164,990.9	18,489.6	100.2	9,923.0	13,859.2	1,253.9
9/1/00	720	10566	136,652.1	0.0	136,652.1	14,998.8	83.0	8,218.5	11,478.8	1,038.6
10/1/00	745	9309	123,764.3	0.0	123,764.3	12,321.2	75.2	7,443.4	10,396.2	940.6
11/1/00	720	10733	135,928.8	0.0	135,928.8	14,558.0	82.6	8,181.6	11,418.0	1,033.1
12/1/00	745	9972	129,296.5	0.0	129,296.5	13,650.4	78.6	7,789.6	10,860.9	982.7
Total Annual	**6321**	**83874**	**1,093,045.0**	**1,862.6**		**117,144.9**	**664.5**	**65,812.3**	**91,972.2**	**8,321.3**
					Annual Emissions, tons/year:	**58.57**	**0.33**	**32.91**	**45.99**	**4.16**

* **Note:** CO & PM10 were estimated using emission factors from AP42 manual, July 1998 supplement.

Annual Average emissions based on data from 7/99-6/00					
2 Year TPY:	**26.517**	**0.160**	**15.866**	**22.204**	**2.009**
Annual Average g/s:	0.76282	0.00461	0.45642	0.63875	0.05779

Summary of Activities and Emissions for Olive 2 Boiler

Date	Hours of Operation	Net Energy (MWH)	Fuel Usage (MCF)	Aux. Fuel (MCF)	Total Fuel (MCF)	NOx Emitted (lbs.)	SO_2 Emitted (lbs.)	CO_2 Emitted (lbs.)	CO Emitted* (lbs.)	PM_{10}* (lbs.)
1/1/96	744	7,504.7	105,555.3	0.0	105,555.3	10621.52	65.78	6515.07	8,866.6	802.2
2/1/96	696	6,847.2	96,080.5	0.0	96,080.5	9379.49	59.62	5904.70	8,070.8	730.2
3/1/96	744	7,231.8	101,631.3	0.0	101,631.3	10401.76	63.42	6281.71	8,537.0	772.4
4/1/96	108	1,009.1	14,876.1	0.0	14,876.1	2531.82	9.31	926.39	1,249.6	113.1
5/1/96	0	0.0	261.3	0.0	261.3	771.52	0.16	15.98	22.0	2.0
6/1/96	34	277.9	4,182.5	0.0	4,182.5	1325.58	2.56	253.58	351.3	31.8
7/1/96	39	705.3	8,716.7	0.0	8,716.7	2003.19	5.36	530.40	732.2	66.2
8/1/96	744	11,022.3	137,022.4	0.0	137,022.4	16602.90	84.75	8394.04	11,509.9	1,041.4
9/1/96	720	9,352.3	122,665.7	0.0	122,665.7	15028.27	75.96	7523.13	10,303.9	932.3
10/1/96	745	8,065.0	112,210.3	0.0	112,210.3	12377.25	68.84	6818.75	9,425.7	852.8
11/1/96	720	7,680.4	107,591.8	0.0	107,591.8	11135.14	66.01	6538.12	9,037.7	817.7
12/1/96	128	2,074.4	25,380.6	0.0	25,380.6	4391.46	15.56	1541.58	2,132.0	192.9
Total Annual	**5422**	**61770**	**836,174.3**	**0.0**		**96,569.9**	**517.3**	**51,243.5**	**70,238.6**	**6,354.9**
			Annual Emissions, tons/year:			**48.28**	**0.26**	**25.62**	**35.12**	**3.18**

Date	Hours of Operation	Net Energy (MWH)	Fuel Usage (MCF)	Aux. Fuel (MCF)	Total Fuel (MCF)	NOx Emitted (lbs.)	SO_2 Emitted (lbs.)	CO_2 Emitted (lbs.)	CO Emitted* (lbs.)	PM_{10}* (lbs.)
1/1/97	0	0.0	475.4	0.00	475.4	912.30	0.29	28.73	39.9	3.6
2/1/97	0	0.0	366.0	345.10	711.1	913.77	0.22	22.12	59.7	5.4
3/1/97	278	3,025.7	41,931.9	769.53	42,701.4	4280.03	25.89	2564.16	3,586.9	324.5
4/1/97	95	1,333.1	16,467.6	345.19	16,812.8	1786.63	10.10	999.97	1,412.3	127.8
5/1/97	744	17,192.5	191,752.3	0.00	191,752.3	24635.14	116.91	11579.37	16,107.2	1,457.3
6/1/97	720	11,871.0	144,475.0	0.00	144,475.0	16883.31	88.07	8723.32	12,135.9	1,098.0
7/1/97	744	13,450.3	160,942.9	0.00	160,942.9	19597.38	97.65	9672.01	13,519.2	1,223.2
8/1/97	744	16,675.7	190,384.9	0.00	190,384.9	26066.67	115.40	11429.87	15,992.3	1,446.9
9/1/97	720	15,281.5	176,229.5	0.00	176,229.5	24050.45	106.98	10596.04	14,803.3	1,339.3
10/1/97	745	12,670.1	152,145.4	0.00	152,145.4	17156.85	92.31	9142.77	12,780.2	1,156.3
11/1/97	56	894.5	10,851.1	1467.30	12,318.4	1491.59	6.58	651.96	1,034.7	93.6
12/1/97	0	0.0	75.2	1773.48	1,848.7	270.05	0.05	4.53	155.3	14.0
Total Annual	**4846**	**90.0**	**1,086,097.1**	**4,700.6**		**138,044.2**	**660.4**	**65,414.8**	**91,627.0**	**8,290.1**
			Annual Emissions, tons/year:			**69.02**	**0.33**	**32.71**	**45.81**	**4.15**

Summary of Activities and Emissions for Olive 2 Boiler

Date	Hours of Operation	Net Energy (MWH)	Fuel Usage (MCF)	Aux. Fuel (MCF)	Total Fuel (MCF)	NOx Emitted (lbs.)	SO_2 Emitted (lbs.)	CO_2 Emitted (lbs.)	CO Emitted* (lbs.)	PM_{10}* (lbs.)
1/1/98	0	0.0	351.3	1648.51	1,999.9	298.77	0.38	37.87	168.0	15.2
2/1/98	0	0.0	445.0	1493.41	1,938.4	299.20	0.27	27.11	162.8	14.7
3/1/98	0	0.0	320.5	876.49	1,197.0	175.64	0.20	19.53	100.5	9.1
4/1/98	0	0.0	453.2	1584.86	2,038.1	367.12	0.31	30.23	171.2	15.5
5/1/98	0	0.0	331.7	1648.99	1,980.7	314.63	0.21	20.26	166.4	15.1
6/1/98	0	0.0	399.6	1505.38	1,905.0	308.33	0.25	24.38	160.0	14.5
7/1/98	733	14,151.7	173,310.9	9.12	173,320.0	22514.97	105.43	10442.08	14,558.9	1,317.2
8/1/98	744	12,993.3	156,767.4	0.00	156,767.4	16710.80	96.05	9513.76	13,168.5	1,191.4
9/1/98	720	10,105.6	128,254.3	0.00	128,254.3	11782.19	78.40	7765.56	10,773.4	974.7
10/1/98	633	8,858.9	111,575.4	131.47	111,706.9	10043.26	68.27	6761.51	9,383.4	849.0
11/1/98	0	0.0	180.4	1660.69	1,841.1	274.56	0.11	10.95	154.6	14.0
12/1/98	254	2,684.1	37,347.8	1096.20	38,444.0	3301.73	22.95	2272.80	3,229.3	292.2
Total Annual	**3084**	**48,793.6**	**609,737.6**	**11,655.1**		**66,391.2**	**372.8**	**36,926.0**	**52,197.0**	**4,722.6**
				Annual Emissions, tons/year:		**33.20**	**0.19**	**18.46**	**26.10**	**2.36**

Date	Hours of Operation	Net Energy (MWH)	Fuel Usage (MCF)	Aux. Fuel (MCF)	Total Fuel (MCF)	NOx Emitted (lbs.)	SO_2 Emitted (lbs.)	CO_2 Emitted (lbs.)	CO Emitted* (lbs.)	PM_{10}* (lbs.)
1/1/99	103	1,383.9	17,560.8	1,434.2	18,995.0	1857.49	10.79	1068.66	1,595.6	144.4
2/1/99	0	0.0	72.5	1,513.3	1,585.9	238.70	0.05	4.41	133.2	12.1
3/1/99	0	0.0	0.0	215.2	215.2	32.01	0.00	0.00	18.1	1.6
4/1/99	0	0.0	105.3	1,508.9	1,614.2	236.71	0.07	6.41	135.6	12.3
5/1/99	0	0.0	128.7	1,561.1	1,689.9	262.31	0.08	7.84	141.9	12.8
6/1/99	0	0.0	82.9	1,548.9	1,631.8	246.14	0.05	5.05	137.1	12.4
7/1/99	281	2,794.4	39,781.4	985.2	40,766.6	2588.00	24.44	2420.89	3,424.4	309.8
8/1/99	507	5,861.1	79,039.3	11.2	79,050.5	5848.31	48.56	4809.92	6,640.2	600.8
9/1/99	262	3,160.6	42,340.1	644.0	42,984.1	4748.39	26.01	2576.60	3,610.7	326.7
10/1/99	159	2,644.6	31,949.9	1,397.4	33,347.2	4091.72	19.38	1919.97	2,801.2	253.4
11/1/99	567	7,739.9	99,145.1	294.1	99,439.2	8522.59	60.08	5950.97	8,352.9	755.7
12/1/99	87	904.4	12,917.5	1,593.8	14,511.3	1161.47	7.83	775.35	1,218.9	110.3
Total Annual	**1966**	**24,488.9**	**323,123.4**	**12,707.5**		**29,833.8**	**197.3**	**19,546.1**	**28,209.8**	**2,552.3**
				Annual Emissions, tons/year:		**14.92**	**0.10**	**9.77**	**14.10**	**1.28**
				Two Year Annual Average:		24.06	0.24	23.35	33.15	3.00

Emission Summary of Boilers & Turbines-2000.xls

Summary of Activities and Emissions for Olive 2 Boiler

Date	Hours of Operation	Net Energy (MWH)	Fuel Usage (MCF)	Aux. Fuel (MCF)	Total Fuel (MCF)	NOx Emitted (lbs.)	SO_2 Emitted (lbs.)	CO_2 Emitted (lbs.)	CO Emitted* (lbs.)	PM_{10}* (lbs.)
1/1/00	151	1,968.8	24,974.7	0.0	24,974.7	2036.72	15.14	1499.06	2,097.9	189.8
2/1/00	182	2,247.3	29,447.6	729.0	30,176.6	2205.44	17.86	1768.47	2,534.8	229.3
3/1/00	151	1,473.3	21,220.5	1,338.6	22,559.0	1397.51	12.87	1274.46	1,895.0	171.4
4/1/00	117	1,685.0	21,394.0	1,320.5	22,714.5	2079.96	13.05	1292.99	1,908.0	172.6
5/1/00	436	7,679.2	93,526.6	550.5	94,077.1	11201.62	57.07	5652.65	7,902.5	715.0
6/1/00	705	12,643.0	153,982.4	3.3	153,985.6	21655.73	93.81	9291.55	12,934.8	1,170.3
7/1/00	744	12,768.8	157,941.9	0.0	157,941.9	22694.60	95.95	9503.07	13,267.1	1,200.4
8/1/00	744	16,954.2	193,522.0	0.0	193,522.0	31205.81	117.51	11638.74	16,255.8	1,470.8
9/1/00	720	12,551.7	154,010.9	0.0	154,010.9	22708.90	93.52	9262.49	12,936.9	1,170.5
10/1/00	296	3,991.2	52,300.4	658.2	52,958.6	6271.84	31.76	3145.44	4,448.5	402.5
11/1/00	0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0
12/1/00	0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0
Total Annual	**4246**	**73,962.7**	**902,320.9**	**4,600.0**		**123,458.1**	**548.5**	**54,328.9**	**76,181.4**	**6,892.6**
					Annual Emissions, tons/year:	**61.73**	**0.27**	**27.16**	**38.09**	**3.45**

* **Note:** CO & PM10 were estimated using emission factors from AP42 manual, July 1998 supplement.

Annual Average emissions based on data from 7/99-6/00					
2 Year TPY:	**33.76**	**0.19**	**19.27**	**27.19**	**2.46**
Annual Average g/s:	0.97117	0.00560	0.55443	0.78211	0.07076

Summary of Fuel Usage and Emissions for Olive 4 Turbine

Fiscal Year 1997-1998

Date	Fuel Usage (MCF)	NOx Emitted (lbs.)	SO_2 Emitted* (lbs.)	CO_2 Emitted* (lbs.)	CO Emitted* (lbs.)	PM_{10}* (lbs.)
July-97	60.4	17.1	0.0	6,976.2	5.2	0.4
Agust-97	2,778.3	787.1	1.7	320,893.7	239.2	19.3
September-97	60.0	17.0	0.0	6,930.0	5.2	0.4
October-97	54.4	15.4	0.0	6,283.2	4.7	0.4
November-97	1,431.0	405.4	0.9	165,280.5	123.2	9.9
December-97	45.0	12.7	0.0	5,197.5	3.9	0.3
January-98	251.7	71.3	0.2	29,071.4	21.7	1.7
February-98	129.0	36.5	0.1	14,899.5	11.1	0.9
March-98	391.4	110.9	0.2	45,206.7	33.7	2.7
April-98	50.0	14.2	0.0	5,775.0	4.3	0.3
May-98	57.5	16.3	0.0	6,641.3	5.0	0.4
June-98	1,641.0	464.9	1.0	189,535.5	141.3	11.4
Total Annual:	**6,949.7**	**1,968.9**	**4.2**	**802,690.4**	**598.4**	**48.2**
Total Annual,	**tons/year:**	**0.984**	**0.002**	**401.345**	**0.299**	**0.024**

Fiscal Year 1998-1999

Date	Fuel Usage (MCF)	NOx Emitted (lbs.)	SO_2 Emitted (lbs.)	CO_2 Emitted* (lbs.)	CO Emitted* (lbs.)	PM_{10}* (lbs.)
July-98	2,930.0	830.1	1.8	338,415.0	252.3	20.3
Agust-98	11,596.3	3,285.2	7.0	1,339,372.7	998.4	80.4
September-98	4,570.7	1,294.9	2.7	527,915.9	393.5	31.7
October-98	129.0	36.5	0.1	14,899.5	11.1	0.9
November-97	11,303.0	3,202.1	6.8	1,305,496.5	973.2	78.3
December-97	1,585.0	449.0	1.0	183,067.5	136.5	11.0
January-99	629.5	178.3	0.4	72,707.3	54.2	4.4
February-99	99.6	28.2	0.1	11,503.8	8.6	0.7
March-99	57.1	16.2	0.0	6,595.1	4.9	0.4
April-99	1,731.9	490.6	1.0	200,034.5	149.1	12.0
May-99	85.9	24.3	0.1	9,921.5	7.4	0.6
June-99	1,744.5	494.2	1.0	201,489.8	150.2	12.1
Total Annual	**36,462.5**	**10,329.8**	**21.9**	**4,211,418.8**	**3,139.4**	**252.7**
Total Annual,	**tons/year:**	**5.2**	**0.0**	**2,105.7**	**1.6**	**0.1**

Fiscal Year 1999-2000

Date	Fuel Usage (MCF)	NOx Emitted (lbs.)	SO_2 Emitted (lbs.)	CO_2 Emitted* (lbs.)	CO Emitted* (lbs.)	PM_{10}* (lbs.)
July-99	151.1	42.8	0.1	17,452.1	13.0	1.0
Agust-99	4,423.4	1,253.1	2.7	510,902.7	380.9	30.7
September-99	657.9	186.4	0.4	75,987.5	56.6	4.6
October-99	4,828.5	1,367.9	2.9	557,691.8	415.7	33.5
November-99	569.1	161.2	0.3	65,731.1	49.0	3.9
December-99	792.1	224.4	0.5	91,487.6	68.2	5.5
January-00	412.5	116.9	0.2	47,643.8	35.5	2.9
February-00	340.5	96.5	0.2	39,327.8	29.3	2.4
March-00	580.5	164.5	0.3	67,047.8	50.0	4.0
April-00	125.1	35.4	0.1	14,449.1	10.8	0.9
May-00	2,854.1	808.6	1.7	329,648.6	245.7	19.8
June-00	12,165.2	3,446.4	7.3	1,405,080.6	1,047.4	84.3
Total Annual	**27,900.0**	**7,904.1**	**16.7**	**3,222,450.0**	**2,402.2**	**193.3**

Annual Average emissions based on data from 7/99-6/00

	NOx	SO_2	CO_2	CO	PM_{10}
2 Year TPY:	**9.117**	**0.019**	**3,716.934**	**2.771**	**0.223**
Annual Average g/s:	0.26227	0.00056	106.92551	0.07971	0.00642

* **Note:** SO2,CO2, CO and PM10 were estimated using emission factors from AP42 manual, July 1998 supplement.

Summary of Fuel Usage and Emissions for Magnolia 5 Turbine

Fiscal Year 1997-1998

Date	Fuel Usage (MCF)	NOx Emitted (lbs.)	SO_2 Emitted* (lbs.)	CO_2 Emitted* (lbs.)	CO Emitted* (lbs.)	PM_{10}* (lbs.)
July-97	59.8	16.9	0.0	6,906.9	5.1	0.4
Agust-97	8,973.3	2,542.1	5.4	1,036,416.2	772.6	62.2
September-97	13,284.7	3,763.6	8.0	1,534,382.9	1,143.8	92.1
October-97	120.5	34.1	0.1	13,917.8	10.4	0.8
November-97	1,790.0	507.1	1.1	206,745.0	154.1	12.4
December-97	45.0	12.7	0.0	5,197.5	3.9	0.3
January-98	70.6	20.0	0.0	8,154.3	6.1	0.5
February-98	136.8	38.8	0.1	15,800.4	11.8	0.9
March-98	59.8	16.9	0.0	6,906.9	5.1	0.4
April-98	40.0	11.3	0.0	4,620.0	3.4	0.3
May-98	906.4	256.8	0.5	104,689.2	78.0	6.3
June-98	0.0	0.0	0.0	0.0	0.0	0.0
Total Annual:	**25,486.9**	**7,220.4**	**15.3**	**2,943,737.0**	**2,194.4**	**176.6**
Total Annual,	**tons/year:**	**3.610**	**0.008**	**1,471.868**	**1.097**	**0.088**

Fiscal Year 1998-1999

Date	Fuel Usage (MCF)	NOx Emitted (lbs.)	SO_2 Emitted* (lbs.)	CO_2 Emitted* (lbs.)	CO Emitted* (lbs.)	PM_{10}* (lbs.)
July-98	7,673.5	2,173.9	4.6	886,289.3	660.7	53.2
Agust-98	12,135.3	3,437.9	7.3	1,401,627.2	1,044.8	84.1
September-98	9,141.5	2,589.8	5.5	1,055,843.3	787.1	63.4
October-98	148.0	41.9	0.1	17,094.0	12.7	1.0
November-97	950.5	269.3	0.6	109,782.8	81.8	6.6
December-97	3,169.0	897.8	1.9	366,019.5	272.9	22.0
January-99	27.7	7.8	0.0	3,199.4	2.4	0.2
February-99	342.9	97.1	0.2	39,605.0	29.5	2.4
March-99	50.6	14.3	0.0	5,844.3	4.4	0.4
April-99	1,051.5	297.9	0.6	121,448.3	90.5	7.3
May-99	85.9	24.3	0.1	9,921.5	7.4	0.6
June-99	2,522.6	714.7	1.5	291,360.3	217.2	17.5
Total Annual	**37,299.0**	**10,566.8**	**22.4**	**4,308,034.5**	**3,211.4**	**258.5**
Total Annual,	**tons/year:**	**5.3**	**0.0**	**2,154.0**	**1.6**	**0.1**
Year Annual Average:		**4.45**	**0.01**	**1812.94**	**1.35**	**0.11**

Fiscal Year 1999-2000

Date	Fuel Usage (MCF)	NOx Emitted (lbs.)	SO_2 Emitted* (lbs.)	CO_2 Emitted* (lbs.)	CO Emitted* (lbs.)	PM_{10}* (lbs.)
July-99	4,910.3	1,391.1	2.9	567,139.7	422.8	34.0
Agust-99	6,669.1	1,889.4	4.0	770,281.1	574.2	46.2
September-99	3,887.5	1,101.3	2.3	449,006.3	334.7	26.9
October-99	5,763.1	1,632.7	3.5	665,638.1	496.2	39.9
November-99	71.1	20.1	0.0	8,212.1	6.1	0.5
December-99	452.6	128.2	0.3	52,275.3	39.0	3.1
January-00	206.3	58.4	0.1	23,827.7	17.8	1.4
February-00	340.5	96.5	0.2	39,327.8	29.3	2.4
March-00	580.5	164.5	0.3	67,047.8	50.0	4.0
April-00	1,532.7	434.2	0.9	177,026.9	132.0	10.6
May-00	4,459.6	1,263.4	2.7	515,083.8	384.0	30.9
June-00	10,906.7	3,089.9	6.5	1,259,723.9	939.1	75.6
Total Annual	**39,780.0**	**11,269.7**	**23.9**	**4,594,590.0**	**3,425.1**	**275.7**
Total Annual,	**tons/year:**	**5.6**	**0.0**	**2,297.3**	**1.7**	**0.1**

Annual Average emissions based on data from 7/99-6/00

2 Year TPY:	**5.459**	**0.012**	**2,225.656**	**1.659**	**0.134**
Annual Average g/s:	0.15704	0.00033	64.02572	0.04773	0.00384

* **Note:** SO2,CO2, CO and PM10 were estimated using emission factors from AP42 manual, July 1998 supplement

City Of Burbank

Revised vjh (2/17/01)

Public Service Department

Source and Stack Parameters

Emission Point	Modeling Location	(x)	(y)	Stack Parameters: Height (Ft)	Height (m)	Diameter (Ft)	Diameter (m)	Gas Temp. (F)	Gas Temp. (K)	Gas Flow Rate (ACFM)	Gas Flow Rate (m/s)
Olive No.1 Boiler	3782224 N 378805 E	378805	3782224	109	33.223	8	2.438	300	422.069	149,969	15.156
Olive No.2 Boiler	3782253 N 378831 E	378831	3782253	109	33.223	8	2.438	230	383.180	167,571	16.935
Magnolia 5 Turbine	3782384 N 378825 E	378825	3782384	40	12.192	11.5	3.505	885	747.069	528,000	53.361
Olive 4 Turbine	3782291 N 378867 E	378867	3782291	70	21.336	11.5	3.505	790	694.291	497,855	50.315
Olive 1 Cooling Tower	3782292 N 3788896 E			n/a		n/a		n/a		n/a	
Olive 2 Cooling Tower	3782327 N 378827 E			n/a		n/a		n/a		n/a	

Note: Source documentation for this data was the 1991 AB2588 Risk Assessment (UTM Coordinates, etc)
Gas Flow rates were derived from various source and CEMS testing from 1994 to 2000.

APPENDIX H.6
MODELING PROTOCOL

PROPOSED MODELING PROTOCOL

FOR THE

MAGNOLIA POWER PLANT PROJECT EXPANSION

BURBANK, CALIFORNIA

Prepared for:

City of Burbank Public Services Department
164 West Magnolia Blvd
Burbank, CA 91503

Prepared by:

URS

130 Robin Hill Road, Ste. 100
Santa Barbara, California 93117
(805) 964-6010 ◆ Fax: (805) 964-0259

February, 2001

URS

February 20, 2001

Ms. Carole Bohnenkamp
Environmental Engineer- Technical Support Office
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, California 94105

Re: Submittal of Magnolia Power Plant Project Expansion Modeling Protocol
Project No. 6600000084.00

Dear Ms. Bohnenkamp:

Enclosed is a dispersion modeling protocol for the proposed Magnolia Power Plant Project Expansion. The proposed project involves construction and operation of a new, natural gas fired combustion turbine generator with a nominal capacity of 270 MW at the existing Magnolia & Olive Power Station in Burbank, California.

The enclosed protocol incorporates standard modeling methodology for criteria and toxic air pollutant impacts as well as an Air Quality Related Values (AQRV) analysis. It is understood that the South Coast Air Quality Management District (SCAQMD) has delegated Prevention of Significant Deterioration (PSD) authority, and will therefore be responsible for PSD review.

This document presents a detailed discussion of the proposed approach for the air dispersion modeling to be conducted for the California Energy Commission (CEC) Application for Certification (AFC), the SCAQMD PSD Application and the SCAQMD New Source Review (NSR) Application. The goal of this document is to obtain EPA, SCAQMD, California Air Resources Board, and CEC approval for the proposed air dispersion modeling approach that will be used for all air quality analysis performed for the proposed project.

Please contact URS by March 2, 2001, or sooner, regarding any comments or questions on the protocol. Your expeditious review of the protocol would be greatly appreciated. Thank you for your consideration of this matter.

Sincerely,

URS Corporation

pp.

Joan A. Heredia
Manager, Air Quality Services

cc. John Yee, SCAQMD
Michael Tollstrop, CARB
Keith Golden, CEC

URS Corporation
130 Robin Hill Road, Suite 100
Santa Barbara, CA 93117
Tel: 805.964.6010
Fax: 805.964.0259

LIST OF TABLES

The Magnolia Power Plant Project Expansion involves construction and operation of a Frame Class natural gas fired, combined cycle power train with a nominal capacity of 270 MW. The proposed plant will be constructed by the City of Burbank (COB), within the existing Magnolia & Olive Power Station site, owned and operated by the COB Public Services Department. Given that the capacity of the new equipment will exceed 100 MW, the project requires that an Application for Certification (AFC) be filed with the California Energy Commission (CEC). The CEC will coordinate with the South Coast Air Quality Management District (SCAQMD) and the United States Environmental Protection Agency (USEPA) to obtain a Determination of Compliance (DOC). The Magnolia & Olive Power Station is an existing Prevention of Significant Deterioration (PSD) major source. Estimated emissions from the proposed project exceed PSD major source modification thresholds. The USEPA has delegated authority to implement PSD to the SCAQMD; therefore the SCAQMD will be the primary point of contact for the PSD Application.

The USEPA, CEC and SCAQMD require that dispersion modeling is used to demonstrate compliance with applicable ambient standards and PSD increments. CEC siting regulations require that the cumulative impacts of the proposed project, together with any reasonably foreseeable projects within a radius of ten kilometers (six miles) of the project site are assessed via dispersion modeling. Modeling is also necessary to assess the impacts of toxic air contaminants (TAC).

1.1 PURPOSE

This document presents the results of the screening modeling that has been performed to date, as well as the proposed approach for the refined air dispersion modeling to be conducted for the AFC, the PSD Application and the Authority to Construct (ATC) Application. The purpose of this document is to obtain CEC and SCAQMD approval of the screening modeling analysis, and agreement on the proposed refined modeling that will be performed to assess air quality impacts from the Magnolia Power Plant Project Expansion.

In addition to refined criteria pollutant modeling, construction emission and TAC modeling and analysis will be performed.

1.2 ORGANIZATION

The balance of this protocol is organized into the following sections:

- 2.0 Project Description
- 3.0 Regulatory Setting
- 4.0 Model Selection

- 5.0 Modeling Approach
- 6.0 Presentation of Results

2.1 PROJECT LOCATION

The Magnolia & Olive Power Station is located at 164 West Magnolia Blvd., Burbank, California. The non-operational, partially demolished Magnolia Units 1 and 2 currently located at the Magnolia & Olive Power Station will be removed and replaced by the proposed Frame Class natural gas fired turbine.

2.2 DESCRIPTION OF THE PROPOSED SOURCES

2.2.1 New Combustion Turbine Generator

The proposed project will consist of one Frame Class, natural gas fired combustion turbine generator (CTG) operating in a combined cycle mode. The CTG will exhaust to a new heat recovery steam generator (HRSG) and stack. The primary emissions are expected to be nitrogen oxides (NO_X), carbon monoxide (CO), volatile organic compounds (VOC), particulate matter (PM_{10}), and sulfur dioxide (SO_2). Turbine emissions of nitrogen oxides will be controlled using a Selective Catalytic Reduction System and dry low-NO_x combustors. Emissions of CO and VOC will be controlled using an oxidation catalyst. While the CTG will be the major operational emissions source, the project will also include a cooling tower and an auxiliary boiler. The cooling tower particulate emissions will be controlled using a high-efficiency drift eliminator.

The applicant is currently evaluating two CTG vendors (Westinghouse 501F and GE 7FA), and a final selection is not expected prior to filing the AFC. Both potential vendors have been considered in the screening modeling analysis.

CTG emissions of NO_X and CO vary with ambient temperature and operating load. Emissions and stack characteristic data (such as volumetric flow rate) for a range of temperature and load combinations have been obtained from the vendor. It is anticipated that the stack height will be 150 feet above grade (this height is subject to change). Screening modeling was performed to determine both short-term and long-term worst-case impacts. The methodologies used in the screening analysis are described later in this protocol. To ensure that the modeled impacts are conservative, the AFC will be based upon refined modeling of the worst-case operating conditions.

2.2.2 Construction Emissions

Emissions will also result from construction activities associated with the removal of Magnolia Units 1 and 2, and installation of the new CTG, HRSG, cooling tower, auxiliary boiler and ancillary equipment. Construction emission sources are expected to include heavy equipment and earthmoving activities.

2.2.3 Toxic Air Contaminants

TAC will also be emitted from the site from the cooling towers and from the combustion of natural gas in the CTG and the auxiliary boiler.

2.3 ESTIMATED EMISSIONS

Estimated emissions from the facility are shown in Table 1. Because the facility is already a major source, the addition of the turbine and auxiliary boiler will be a major modification for NO_x (in excess of 40 tons per year).

TABLE 1

ESTIMATED EMISSIONS FOR 270 MW PLANT
(TONS PER YEAR)

NO_x	CO	SO_2	VOC	Particulates
63	94	5	21	83

The emission estimates for the CTG include the use of proposed controls assuming NO_X emission rates of 2.0 ppmvd @15% O_2 based on a three-hour average, and CO emissions at 6.0 ppmvd @15% O_2 based on a three-hour average. Auxiliary boiler emissions and cooling tower emissions will be based on vendor data. In addition to the criteria pollutant emissions, TAC will be emitted. The TAC emission estimates from combustion sources will be based on emission factors from the "California Air Toxics Emission Factors" (CATEF) database. Cooling tower emissions of particulate matter and TAC will be estimated based on water quality data and the expected drift characteristics of the proposed cooling tower design.

Construction emissions for equipment and earthmoving will be based primarily on USEPA AP-42 emission factors and the SCAQMD CEQA Handbook. Where appropriate, emission factors provided by construction equipment vendors may be used in the determination of construction emission rates.

Representative meteorological data, including mixing height data.

- A worst-case air quality impact assessment, including an assessment of cumulative impacts.

- An emission offset strategy, if required (not discussed as part of this modeling protocol).

For this project, the worst-case air quality impact assessment will be performed using dispersion models. The model selection and approach are discussed in more detail in Sections 4.0 and 5.0 of this protocol.

3.2 FEDERAL PREVENTION OF SIGNIFICANT DETERIORATION PROGRAM

The EPA has promulgated PSD regulations for areas that are in compliance with the National Ambient Air Quality Standards. The PSD program allows new sources to be constructed or existing sources to be modified while preserving the existing ambient air quality levels, protecting public health and welfare, and limiting degradation in specific areas, depending on the PSD class of the area. The proposed project area has been designated a Class II area. Class I areas (e.g., national parks and wilderness areas) are more sensitive than Class II areas and therefore, have lower levels of allowable degradation.

The principal requirements of the federal PSD program are as follows:

- BACT
- Pre-construction monitoring
- Increment analysis, and
- Air quality impact analysis.

The PSD requirements apply on a pollutant-specific basis to any project that is a new major stationary source or a major modification to an existing stationary source. The proposed project is subject to PSD review for NO_2. As such, BACT will be applied to the facility. Pre-construction monitoring is not anticipated, since representative baseline ambient air quality data are available in Burbank and other nearby monitoring stations. The air quality impact analysis methodology is presented in Section 5.0 of this protocol. An Air Quality Related Value (AQRV) ambient analysis will also be prepared as part of the PSD application.

3.3 LOCAL NEW SOURCE REVIEW (NSR) REQUIREMENT

Local rules are established by the SCAQMD and are contained in the SCAQMD Rules and Regulations. Regulation XIII contains requirements for NSR for criteria pollutants and applies to project emissions of federal and state nonattainment pollutants or precursors of nonattainment pollutants. NSR contains three principal elements:

- BACT and lowest achievable emission rate (LAER)
- Air quality impact analysis, and
- Emissions offsets.

Regulation XIV covers NSR requirements for TAC emissions. This regulation requires that modeling is performed for all required TAC emissions. Also required are the calculation of cancer burden, chronic and acute hazard indices, and cancer risk per year.

The dispersion model selection and the approach for the air quality impact analysis are presented in Section 5.0. Emission offsets are not discussed as part of this modeling protocol.

Model selection will consider several factors, including the following:

- Regulatory requirements
- Type of pollutant (inert or photochemical)
- Source type(s)
- Project setting (terrain, coastal areas, etc.)
- Level of input data (source and meteorological) available
- Desired output (concentration, deposition, visibility impact).

Both the CEC and the SCAQMD require that any dispersion model undergo peer review and acceptance by the USEPA. These so called "regulatory models" are available on the USEPA Technology Transfer Network bulletin board. In addition, private companies have designed programs to make the set up of these models more user friendly and more flexible. The algorithms for model execution in these programs remain the same as the USEPA versions.

For the proposed project, models for four purposes are required. One must be capable of simulating the ambient concentration increases resulting from the project's emitted pollutants. Concentration increases must be used to demonstrate compliance with PSD significance levels and ambient air quality standards. The second type of model must be capable of predicting impacts on visual range. These models typically estimate whether or not a plume from the source is visible from a given location. The observer point is usually located at a sensitive receptor, such as the boundary of a PSD Class I area. The third model must be capable of assessing risk to a maximally exposed individual. The fourth model is used to estimate impacts of inversion break-up fumigation.

The proposed power plant will emit both criteria and non-criteria pollutants. These pollutants will be assumed to be inert for the purpose of modeling. In keeping with CEC and SCAQMD policy, no photochemical modeling for ozone will be conducted. Initial modeling will assume full conversion of NO_x to NO_2. Should it be required, NO_2 estimates may be refined using an applied ratio of 0.75 as recommended in the Guidelines for Air Quality Models (40 CFR Parts 51 and 52) and agreed upon by the USEPA and/or the Ozone Limiting Model (OLM).

Construction emissions associated with the proposed project will consist of particulate matter from travel on unpaved roads and wind erosion of disturbed areas. Other pollutants, primarily NO_X and CO, will be emitted from fuel combustion in heavy construction and earthmoving equipment. Thus the model must be able to simulate point source and volume source emissions. Construction emissions will occur for a temporary period of time throughout the project.

Operational emissions will consist of turbine exhaust, auxiliary boiler (hot, buoyant plumes) and drift from the cooling tower. Aerodynamic downwash from nearby buildings and structures may affect plume dispersion and will be addressed in the modeling analysis. Emissions of concern during the operation of the proposed facility will consist primarily of NO_X, CO, and PM_{10}.

4.1 SCREENING ANALYSIS OF TURBINE OPERATIONS

A screening modeling analysis was performed to compare the two prospective turbines and to identify the turbine and operating conditions that will cause the highest offsite pollutant concentrations. Turbine emissions of NO_X and CO, and exhaust characteristics vary with load and ambient temperature. Turbine operating conditions comprise various combinations of operating loads and ambient temperatures. The screening modeling also included PM_{10} to determine worst-case operating conditions for a 24 hour period. Results from the screening modeling analysis were used to determine the worst-case turbine and operating conditions to be used in the refined modeling analysis.

The screening dispersion modeling analysis was performed using the USEPA's Industrial Source Complex Short-Term 3 (ISCST3) model (Version 00101). The ISCST3 model is a steady-state, multiple-source, Gaussian dispersion model. The ISCST3 model includes many options to address unique modeling requirements. Some of these options are discussed below, and the options chosen for analyses performed for this proposed project are identified.

ISCST3 incorporates simple terrain algorithms for estimating impacts at receptors where ground level elevations are equal to or less than the heights of the emission sources (specifically stacks). To estimate the impacts at receptors with ground-level elevations that exceed the final plume height centerline, the ISCST3 model incorporates complex terrain algorithms from the COMPLEX-I model. In default mode, the model follows USEPA's guidance for calculation of impacts in intermediate terrain, that is, where ground level elevations are located between the emission release height and the final plume height centerline (USEPA 1995). For intermediate terrain receptors, the ISCST3 model calculates concentrations using both simple terrain algorithms and complex terrain algorithms. The model then compares the predicted concentrations at each receptor, on an hourly basis, and the highest concentration per receptor is output from the model. Section 5.1 of this protocol summarizes further modeling methodologies.

4.2 REFINED MODELING

The ISCST3 model will be used for refined modeling of the worst-case facility impacts to define the maximum area of impact for NO_2 and to assess compliance with ambient air quality standards, PSD increments, and the SCAQMD 1-hour significant change level.

Background pollutant data plus predicted source impacts will be compared to the ambient air quality standards. Concentrations of PM_{10} will be analyzed to determine compliance with the SCAQMD 24-hour significant change level. One year of surface meteorological data from Burbank, California will be used to model impacts from operational emissions. Mixing height data were calculated using upper air data from Ontario, California. The meteorological data, which is required to be specific to the area of the project, were obtained from the SCAQMD.

Under certain circumstances, the ISCST3 model may not allow the applicant the operating flexibility required for the project. In this case, the modeling methodologies may be refined and an alternative regulatory model may be used. If an alternative model is to be used for the Magnolia Power Plant Project Expansion air quality impact analysis, a supplement to this protocol will be submitted.

4.3 CLASS I MODELING ANALYSIS

The USEPA and the SCAQMD require that a visibility analysis be performed to assess impacts on Class I areas within 100 kilometers of the proposed project. A level one visibility analysis will be performed using the VISCREEN model for any Class I areas located within 50 km of the site. For Class I areas between 50 and 100 km of the site, a more rigorous analysis may be performed. The US Forest Service has been contacted regarding the nearby Class I areas.

4.4 MODELING OF CONSTRUCTION EMISSIONS

The CEC guidelines require modeling of PM_{10}, CO, and NO_X emissions from construction activities. Modeling of construction emissions will be performed using the ISCST3 model. The ISCST3 is able to simulate point and volume sources, as well as particulate deposition, should such an assessment be required. It is assumed, however, that deposition modeling will not be required. Impacts from construction are anticipated to be localized within and around the facility boundaries in flat terrain.

4.5 HEALTH RISK ASSESSMENT (HRA) MODELING

The CEC and the SCAQMD require a risk assessment of air toxic emissions from the proposed project. The ISCST3 model output will be used to perform the risk assessment using the methods presented in the "Air Toxics Hot Spots Program, Revised 1992, Risk Assessment Guidelines" as developed by the California Air Pollution Control Officers Association (CAPCOA).

Cancer potency and acute and chronic reference exposure level (REL) factors will be obtained from the latest approved documentation by the Office of Environmental Health Hazard Assessment (OEHHA). The ISCST3 outputs will by used in conjunction with current toxicological data and the ACE model to estimate cancer risk, chronic and acute hazard indices for inhalation, dermal exposure, soil ingestion and mother's milk pathways.

4.6 CUMULATIVE IMPACT MODELING

CEC siting regulations require that the cumulative impact of the proposed project together with emissions from other existing sources and any reasonably foreseeable projects within ten kilometers (six miles) of the project site be assessed via modeling. For the cumulative impact modeling, the above sources, in addition to any potential stationary emissions sources within this distance of the project site that have received construction permits but are not yet operational will be identified and evaluated using the ISCST3 model.

5.1 SCREENING MODELING

Screening modeling was performed to select the worst-case turbine (Westinghouse 501F versus GE 7FA) from an air emissions and operating conditions standpoint. The proposed project is in the design phase and potential turbine vendors are currently being evaluated by the COB. Final turbine selection is not expected prior to submittal of the AFC. Therefore, the air quality modeling and HRA must reflect the worst-case turbine and/or operating scenario. The selection must consider that turbine emissions vary with load and ambient temperature.

As stated in Section 4.1, the ISCST3 modeling was used in the screening modeling analysis. Technical options selected for the ISCST3 modeling are listed below. These are referred to as the regulatory default options in the ISCST3 User's Guide (USEPA 1995), except where the SCAQMD requires alternative options. The input options for ISCST3 are as follows:

- Final plume rise
- Buoyancy induced dispersion
- Stack tip downwash
- Urban dispersion coefficients (SCAQMD requirement)
- No calm processing routine (SCAQMD requirement)
- Default wind profile exponents (urban)
- Default vertical temperature gradients
- Anemometer height of 10 meters

The ISCST3 model is a steady state model that can simulate the transport of emissions from point sources, area sources, volume sources and open pits. The ISCST3 model requires the input of various source and site specific data. The proposed turbine was modeled as a point source. Parameters required for modeling point sources include source location, stack base elevation, stack height, stack inner diameter, stack gas exit velocity, and stack gas exit temperature. Source parameters used in screening analyses for the GE and Westinghouse turbines were provided by the respective vendors.

To determine whether or not a structure (building) potentially affects pollutant dispersion from a nearby emission source, the USEPA provides specific guidance (USEPA, 1997). The guidance states that, if a structure is located within a certain distance from the emission source (stack), downwash effects on the dispersion of stack emissions must be considered. Stack heights that minimize downwash effects are good engineering practice (GEP) stack heights.

A software package developed by the USEPA, Building Profile Input Program (BPIP), was used as part of the detailed downwash analysis. This program calculates the GEP formula heights and direction-specific building dimensions for input into the ISCST3 model.

The modeling was performed assuming a stack diameter of 19 feet and a stack height of 150 feet; this height is below GEP height. Due to the proximity of structures and buildings, the potential for aerodynamic downwash effects were evaluated to assess if localized ambient air impacts would occur. Existing and proposed buildings and structures were incorporated into the modeling analysis.

The input of meteorological data is also required by the ISCST3 model. The required data include surface wind speed, surface wind direction, surface ambient temperature, stability class and mixing height data. The SCAQMD has various meteorological data sets for locations throughout the South Coast District. The SCAQMD has determined that these data are representative and requires their use in most applications. The data set includes one year of meteorological data for the year 1981. For this project, the Burbank meteorological data set was used. The Burbank monitoring station is located approximately one kilometer to the northeast of the Magnolia Power Plant Project Expansion site.

Screening modeling was conducted to identify the combination of conditions that result in maximum estimated air quality impacts. For each turbine (GE or Westinghouse), the screening modeling included conditions of 100 percent load (high load) and 75 percent load (average load) at temperatures of 95°F and 41°F. In addition, one duct firing scenario was added for the 95°F temperature at 100 percent load. Low load conditions (45 percent load) were also analyzed for the GE turbine. This condition is not guaranteed by Westinghouse, and therefore was not included in the modeling analysis. Impacts associated with annual (long-term) and 1 hour (short-term) averaging periods for NO_2, 1 hour and 8 hour averaging periods for CO, and 24 hour and annual averaging periods for PM_{10} were evaluated. The turbine scenario with the highest overall offsite impacts ("worst case condition") under the range of operating conditions will subsequently be used in the refined modeling analysis.

Emissions from the operation of the cooling tower and the auxiliary boiler were not included in the screening analysis; however these will be part of the refined modeling analysis and the assessment of total project impacts.

Turbine emissions and stack gas flow rates exhibit variations based on ambient temperature and operating load. Emissions of NO_x and CO exhibit the most significant variation under different operating conditions. Emissions of PM_{10} and SO_2 are expected to remain relatively constant over the range of turbine operating conditions expected at the site. However, PM_{10} emissions will increase with the use of duct firing and were included in the analysis to determine the worst-case modeling scenario for a 24 hour averaging period.

In the screening modeling analysis, maximum impacts were predicted for two different turbine load levels at two different ambient temperatures (there was one additional load condition for the GE turbine). These loads and temperatures were chosen to represent different potential operating conditions to accommodate operational flexibility.

At low load, pollutant emission rates are lower, as are stack flow rates. This leads to lower plume rise and can result in higher impacts closer to the source, before the plume has undergone much dispersion. Therefore, even though mass emission rates are lower, there is the potential for impacts to be higher at low load.

At lower ambient temperatures (e.g., 41°F), the atmosphere is denser and a greater mass of air can flow through the turbines, resulting in higher mass emission rates and flow rates. Conversely, at higher ambient temperatures (e.g., 95°F), the pollutant mass emission rates are lower than at 41°F, but again, so are the flow parameters, and hence the plume rise. As ambient temperature varies, higher mass emissions are associated with higher plume rise and greater dispersion.

Receptors are offsite locations, or points, where the model calculates pollutant concentrations. Receptors for the screening analysis were placed approximately every 25 meters along the property boundary, at 25 meter increments to a distance of no less than 200 meters, at 100 meter increments to a distance of approximately 1 kilometer, and at 250 meter increments to a distance of 5 kilometers. Additional receptors were placed at 500 meter increments to a distance of 10 kilometers from the Project site. UTM coordinates were used to identify receptor locations. Receptor elevations were obtained from electronic United States Geological Survey (USGS) map data (Digital Elevation Models [DEMs]).

The worst-case turbine is selected based on which one will cause the highest pollutant concentrations. The worst-case condition is defined as the operating scenario, of the worst-case turbine, that creates the highest overall pollutant concentrations under the proposed operating loads and ambient temperatures. Although annual average concentrations were calculated as part of this modeling analysis, the analysis is best used to determine scenarios for the refined short-term modeling. Average annual modeling should be based on annual average operating conditions.

For the Magnolia Power Plant Project Expansion, the worst case turbine has been identified as Westinghouse. The Westinghouse turbine showed the highest concentrations under the duct fired case for both CO and NO_2. Although the GE turbine showed higher concentrations under other operating conditions, to be conservative, the Westinghouse turbine parameters and emission rates for duct firing will be used to simulate potential short-term project impacts for CO and NO_2.

The GE turbine showed higher impacts for both 24 hour and annual concentrations of PM_{10}. These maximum concentrations also occurred under the duct firing operating scenario. The higher GE concentrations are primarily due to the higher predicted PM_{10} emissions under all operating scenarios.

Therefore the Westinghouse turbine emissions and exhaust characteristics will be used in the refined modeling analysis, with the exception that PM_{10} emissions will be based on the GE turbine.

5.2 REFINED MODELING

The refined modeling will include the following:

- Modeling of CO, NO_X, and PM_{10} emissions from the new CTG and the cooling tower.

- Receptors will be placed at approximately 25 meter increments along the property boundary, at 25 meter increments to a distance of 100 meters, at 100 meter increments to a distance of 1 kilometer, at 250 meter increments to a distance of 5 kilometers and at 500 meter increments at a distance of 5 to10 kilometers from the Project site.

- Placement of fine receptor grids at 50 meter spacing around the receptor with highest impacts to refine the location of maximum concentrations.

- If necessary, use of the Applied Ratio Method or the OLM to address conversion of nitrogen oxides to nitrogen dioxide.

Specific ISCST3 modeling options following regulatory default options and assumptions as specified below:

- Urban dispersion (SCAQMD requirement)
- Wind profile exponents of 0.15, 0.15, 0.2, 0.25, 0.3 and 0.3 for the urban mode (SCAQMD requirement)
- Final plume rise
- Stack tip downwash
- Buoyancy-induced dispersion
- No calm processing routine (SCAQMD requirement)

The refined modeling results will be used to assess compliance with ambient air quality standards, compliance with SCAQMD significant change levels and to define the PSD significant impact area. The PSD significant impact area is defined as a circle with a radius equal to the greatest distance from the source where refined modeling predicts annual NO_2 concentrations to exceed the PSD significance levels. SCAQMD significant change levels are summarized in Table 2 below.

TABLE 2

SIGNIFICANCE LEVELS
(Micrograms Per Cubic Meter)

Pollutant	Annual	24-Hour	8-Hour	3-Hour	1-Hour
PSD NO_2	1.0	N/A	N/A	N/A	N/A
SCAQMD NO_2	N/A	N/A	N/A	N/A	20
SCAQMD PM_{10}	N/A	2.5	N/A	N/A	N/A

As requested by the CEC, a modeling analysis will be performed that will include the existing sources at the Project site, as well as the proposed new sources. The modeled concentrations will then be added to background concentrations to determine whether or not an ambient air quality standard would be exceeded. However, it should be noted that emissions from the existing sources are also incorporated into the monitored background concentrations. Therefore, the existing sources will be 'double counted', and consequently the total facility contribution at the location of maximum impact will be overestimated. Because NO_2 is the only criteria pollutant currently below ambient air quality standards, it will be the only pollutant included in the analyses.

The fumigation analysis will be performed using the SCREEN3 model and procedures set forth in the USEPA's 'Screening Procedures for Estimating the Air Quality Impact of Stationary Sources', Revised (October 1992) (EPA-450/R-92-019). The worst-case meteorology will be used with F stability and a wind speed of 2.5 meters per second. If the concentrations estimated by SCREEN3 are above significance levels, the modeling analysis will be refined.

5.2.1 PSD Increment Analysis

The facility will require an increment analysis if modeling shows impacts to be greater than PSD significance levels. The overall purpose of the increment analysis is to demonstrate that, for attainment pollutants, emissions from a new source, in conjunction with emissions from existing sources, will not cause or contribute to significant deterioration of ambient air quality.

5.3 CLASS I MODELING ANALYSIS

The USEPA recommended VISCREEN model will be used to predict visibility impacts on Class I areas within 50 kilometers of the proposed project. For Class I areas between 50 and 100 km of the site, a more rigorous analysis may be performed. The analysis will be performed according to the procedures outlined in the Interagency Workgroup on Air Quality Modeling (IWAQM). The US Forest Services (Mike McCorison) has been contacted regarding the nearby Class I areas, and has been made aware of the Magnolia Power Plant Project Expansion. URS will prepare a protocol that will be submitted to the US Forest Services regarding the necessary analyses in the Class I area.

5.4 MODELING OF CONSTRUCTION EMISSIONS

Modeling of PM_{10}, CO and NO_2 emissions associated with demolition and construction activities will be performed using the ISCST3 model and the SCAQMD 1981 Burbank meteorological data set. The model options will be as indicated in Section 5.2 for ISCST3 refined modeling of operational emissions. PM_{10} emissions will be estimated for onsite construction equipment exhaust and from onsite fugitive dust due to earthmoving activities. Emissions of CO and NO_X will be estimated from the exhaust of the various types of onsite equipment used during construction activities. The 24 hour and annual concentrations of PM_{10}, 1 hour and 8 hour concentration of CO, and 1 hour and annual concentrations of NO_2 will be modeled. Deposition modeling will not be performed.

Emissions of CO and NO_X will be estimated from the exhaust of the various types of offsite equipment used during construction activities for linear support facilities. Modeling will not be performed for offsite linear construction equipment.

5.5 HEALTH RISK ASSESSEMENT MODELING

A health risk assessment will be performed to estimate offsite impacts from emissions of TAC. The ISCST3 model will be used in conjunction with the ACE model to include multiple exposure pathways. Coarse and fine grid receptors will be analyzed as well as sensitive and discrete receptors. Burbank (1981) meteorological data will be used as described in Section 4.2, and the receptor grids used will be as described in Section 5.2 (Refined Modeling).

The health risk modeling analysis will be used to:

- Define the location of the Maximally Exposed Individual (MEI). The MEI is the location where the highest carcinogenic risk may occur.

- Define the location of the maximum chronic and acute non-carcinogenic adverse health effects and the location of the maximum acute adverse health effects.

- Calculate pollutant-specific concentrations and adverse health effects at locations of maximum impact.

- Calculate the cancer burden at nearby census tracts.

- Calculate cancer risk per year.

- Calculate cancer risk, and chronic and acute hazard indices at sensitive and discrete receptors.

5.6 CUMULATIVE ANALYSIS

As required by CEC Guidance, a cumulative modeling analysis will performed that will include any sources which have received construction permits or are in the permitting process within 10 kilometers (6 miles) of the proposed facility. It is assumed that the SCAQMD will have on file and provide the necessary source information for this analysis.

5.7 GROWTH ANALYSIS AND SOILS AND VEGETATION ANALYSIS

A growth analysis and a soils and vegetation analysis will be performed. This analysis will take into consideration the deposition of nitrates and sulfates. The nitrate analysis will include an estimate of annual nitrate deposition based on annual modeled NO_2 and SO_2 concentrations. The concentrations of estimated nitrates and sulfates will be analyzed in conjunction with a review of local plant species to determine if there are any significant impacts. Because the site is existing and is located in an urbanized area, it is unlikely there will be any adverse impacts to local plant species. The growth analysis will include a qualitative analysis to determine whether or not the operation of the Magnolia Power Plant Project Expansion would impact population growth and/or air quality within the surrounding area.

The modeling results for criteria pollutants will be presented in the air quality section of the AFC. This section will describe the models used, modeling options, and the derivation of all model inputs (such as emission estimates). Model results will be presented in tabular form. The model input and output files will be provided to the CEC, the USEPA, and the SCAQMD in electronic format.

As applicable, the AFC will include a section that describes the methodologies utilized in the screening health risk assessment. These results will also be presented in tabular form.

Staff Comments on the Magnolia Power Plant Expansion modeling protocols

Staff notes that the applicant has already performed the screening level modeling, but has not provided the results of the modeling with these protocols. Based on the protocols provided, staff finds that the screening level modeling performed is inadequate. Staff provides the following comments so that future modeling efforts will remedy this situation for this project.

Annual emission factors are identified on page 2-2, however it is unclear what exactly is being modeled. All pollutants must be modeled (NOx, SOx, PM10 and CO). For short-term ambient air quality standards (1 hr, 3 hr, 8 hr and 24 hr) the auxiliary boiler (as well as the emergency engine and firewater pump if present) must be modeled with the cooling towers both under full load, while the turbine is in startup, partial load and full load modes of operation. For long-term ambient air quality standards (annual) the emissions should include the number of hours the turbine is in startup, partial load and full load modes of operation, the number of hours the auxiliary boiler is in operation and with the cooling tower operating at full load for 8760 hours. Additionally, the emergency IC engine and the firewater pump (if present) should be assumed to be operating at 200 hours each. All this modeling should be done at a full representative range of meteorological conditions. If an inlet chiller is to be used, it must also be taken into account for its effects on the emission factors. Lastly, it is not clear if there will be any duct firing for this project. If there is, then that too must be taken into account in both the short-term and long-term emissions factors.

Comments from EPA on recent siting cases have indicated that EPA considers the NOx BACT level to be 2.0 ppm @ 15% O_2 averaged over 1 hour. CO is likely to be 6.0 ppm and VOC is likely to be 1.4 ppm both @ 15% O_2 averaged over 1 hour. PM10 is likely to be 11 lbs/hr and SOx is calculated based on the expected sulfur content of the fuel.

Staff agrees with the use of meteorological data from Burbank, California. Staff also accepts that the upper air data used to determine the mixing height will be taken from Ontario, California (page 4-3), but reminds the applicant that they need to use the surface data from Burbank in this same calculation. Also, the applicant is reminded that all meteorological data is to be supplied to the CEC both as supplied by the identified sources and as used in the ISC modeling (including the mixing heights used).

Staff notes that the ambient air quality monitoring stations to be used to determine the appropriate background pollution concentrations have not been identified.

The applicant has indicated on several pages of section 4 that some criteria pollutants will not be modeled for either construction or operation. Please note that the CEC requires NOx, SOx, CO and PM10 to be modeled for both construction activities and operation, as well as both screen and refined level modeling.

On page 5-1, the applicant discusses the screening and refined modeling to be performed in some detail. For screening level modeling, (page 5-2), the applicant identifies several loads and temperatures at which the turbine is modeled. In addition to these conditions, staff would like to see full load with duct firing at 41 ^{0}F as well as startup conditions at 95 ^{0}F and 41 ^{0}F. It is unclear as to what ambient temperature the GE turbine was modeled at low load condition (45% load). Additionally the Westinghouse turbine was not modeled at the same low load condition as the GE turbine. The CEC requires modeling that reflects the expected use of the turbine. Therefore, unless the applicant intends to use the turbines (either GE or Westinghouse) differently, they need to be modeled under the same conditions. Additionally, those modeling results must ALL be reported in the AFC. The objective of screen modeling is to determine the worst case operational scenario for each pollutant for each turbine manufacturer (when multiply manufacturers are considered). These "worst case" scenarios will be modeled in the refined modeling section.

The applicant proposed a receptor grid system that is inconsistent with other recent projects (page 5-3). Staff would prefer the following receptor grid system:

Distance from fence line (Km)	Gird spacing (m)
0.0 to 0.5	30
0.5 to 1.0	100
1.0 to 10	250

The applicant further proposes to place 50 meter grid spacing around the point of highest impact. Staff would prefer 30 meter grid space for 1,000 meters around the points of maximum and second maximum impacts.

The applicant proposes to model construction emissions, but neglects to include SOx (page 5-6). The applicant must model NOx, SOx, CO and PM10 from combustion and fugitive dust separately. Construction emission sources must be included, as well as timing of use of those sources. Also, source references are required for all emission factors used.

Finally, the applicant is reminded that all calculations made must be submitted with the AFC either in appendices or electronically.

Building Profile Input Program Input Information

Building ID	Easting (m)	Northing (m)	Height (m)
WATER	378735	3782446	13.1
	378748	3782434	
	378733	3782417	
	378719	3782429	
ADMIN1	378707	3782439	13.1
	378715	3782432	
	378732	3782450	
	378734	3782449	
	378737	3782452	
	378738	3782451	
	378744	3782458	
	378749	3782454	
	378751	3782456	
	378754	3782453	
	378755	3782454	
	378773	3782474	
	378764	3782483	
	378759	3782477	
	378743	3782492	
	378729	3782476	
	378728	3782477	
	378725	3782472	
	378729	3782467	
	378731	3782466	
STORE1	378752	3782417	5.4
	378793	3782380	
	378784	3782370	
	378743	3782408	
WHSE	378809	3782378	9.5
	378795	3782362	
	378858	3782304	
	378861	3782307	
	378866	3782303	
	378870	3782307	
	378888	3782327	
	378872	3782342	
	378867	3782337	
	378850	3782352	
	378842	3782344	
	378830	3782355	
	378832	3782357	
OLIVE1	378914	3782337	26.6
	378880	3782300	
	378897	3782285	
	378896	3782284	
	378911	3782270	
	378916	3782275	
	378922	3782269	
	378931	3782279	
	378929	3782281	
	378937	3782290	
	378934	3782294	
	378947	3782308	
OLIVE2	378913	3782339	26.6
	378947	3782308	
	378953	3782315	
	378956	3782312	
	378964	3782322	
	378967	3782319	
	378975	3782328	
	378936	3782364	
OLIVE3	378936	3782364	26.6
	378971	3782332	
	378977	3782338	
	378978	3782337	
	378985	3782344	
STORE3	378859	3782388	7.6
	378879	3782368	
	378888	3782377	
	378867	3782397	
SHOP1	378841	3782369	9.1
	378848	3782362	
	378865	3782380	
	378858	3782386	
SHOP2	378789	3782416	9.1
	378811	3782395	
	378823	3782408	
	378826	3782405	
	378834	3782413	
	378836	3782411	
	378855	3782431	
	378829	3782455	
	378821	3782446	
	378819	3782449	
MAG3_4	378881	3782496	16.8
	378875	3782490	
	378872	3782493	
	378868	3782488	
	378862	3782493	
	378840	3782469	
	378884	3782429	
	378906	3782453	
	378902	3782457	
	378911	3782467	
	378895	3782482	
	378885	3782472	
	378881	3782476	
	378886	3782481	
	378882	3782484	
	378887	3782490	
ADMIN2	378822	3782532	13.1
	378838	3782517	
	378815	3782492	
	378802	3782504	
	378811	3782514	
	378808	3782516	
CT	378957	3782573	12.8
	378948	3782562	
	379012	3782503	
	379022	3782513	
STEAM	378872	3782539	21.9
	378896	3782516	
	378929	3782552	
	378905	3782574	
INTAKE	378850	3782546	26
	378844	3782539	
	378851	3782533	
	378858	3782539	
	378850	3782546	
TURBINE	378857	3782555	6.4
	378865	3782547	
	378866	3782548	
	378868	3782546	
	378875	3782553	
	378864	3782562	
GEN	378852	3782545	18.3
	378859	3782552	
	378863	3782549	
	378856	3782541	

Building Profile Input Program Input Information

Building ID	Easting (m)	Northing (m)	Height (m)
	378949	3782376	
	378949	3782376	
	378947	3782377	
OLIVE4	378949	3782377	26.6
	378953	3782382	
	378954	3782381	
	378959	3782387	
	378964	3782382	
	378960	3782378	
	378962	3782376	
	378971	3782385	
	378975	3782381	
	378965	3782370	
	378966	3782369	
	378969	3782372	
	378970	3782372	
	378974	3782376	
	378981	3782369	
	378975	3782363	
	378990	3782349	
	378985	3782344	
OLIVECT1	378970	3782397	7
	378971	3782395	
	378970	3782394	
	379006	3782361	
	379011	3782365	
	379017	3782361	
	379021	3782366	
	379018	3782369	
	379018	3782370	
	379020	3782368	
	379025	3782372	
	378984	3782409	
	378975	3782400	
	378974	3782401	
STORE2	378995	3782423	9.1
	378989	3782417	
	379036	3782374	
	379042	3782380	
OLIVECT2	378959	3782489	11.3
	378943	3782472	
	378952	3782465	
	378948	3782460	
	378952	3782457	
	378956	3782461	
	378972	3782446	
	378969	3782442	
	378972	3782438	
	378976	3782442	
	378985	3782435	
	378995	3782446	
	378996	3782440	
	378993	3782435	
	378988	3782429	
	379033	3782389	
	379057	3782416	
	379018	3782451	
	379001	3782451	

Building ID	Easting (m)	Northing (m)	Height (m)
EXP	378878	3782575	11.1
	378874	3782570	
	378871	3782565	
	378867	3782560	
	378870	3782558	
	378875	3782562	
	378880	3782565	
	378884	3782569	
HRSG	378897	3782597	25.3
	378878	3782575	
	378884	3782569	
	378904	3782591	
STORE4	378905	3782635	6.3
	378885	3782613	
	378867	3782628	
	378889	3782652	
STORE5	378966	3782584	5.6
	378961	3782579	
	378895	3782646	
	378901	3782651	
STORE6	379034	3782517	9.1
	379031	3782514	
	379048	3782497	
	379052	3782500	
STORE7	379052	3782500	9.1
	379043	3782489	
	379072	3782461	
	379081	3782471	
STORE8	379096	3782457	9.1
	379081	3782443	
	379113	3782414	
	379126	3782428	
OFFSITE	378918	3782687	6.1
	378939	3782709	
	379045	3782605	
	379024	3782584	

APPENDIX H.8
STACK PARAMETERS AND EMISSION RATES

Magnolia Power Station
GE Stack Parameters and Emission Rates

Case Number	**1**	**3**	**4**	**6**	**13**	**14**	**Duct Fired**
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CTG Load	100%	45%	100%	45%	75%	75%	100%
Ambient Temperature, F	95	95	41	41	95	41	95
HRSG Firing	Unfired	Unfired	Unfired	Unfired	Unfired	Unfired	Fired
Exhaust Parameters							
Stack Exit Temperature, K	365.90	355.12	364.62	353.24	359.90	359.62	360.18
Stack Diameter, meters (estimated)	5.79	5.79	5.79	5.79	5.79	5.79	5.79
Stack Exit Velocity, m/s	17.39	11.11	18.42	11.35	13.50	14.59	18.26
Nitrogen Oxide Emissions							
NOx, ppmvd @ 15% w/ Control	2.00	2.00	2.00	2.00	2.00	2.00	2.00
NOx, lb/hr @ 15% w/ Control	12.22	7.54	13.33	8.00	9.35	10.44	16.93
NOx, g/s @ 15% w/ Control	1.54	0.95	1.68	1.01	1.18	1.32	2.13
Carbon Monoxide Emissions							
CO, ppmvd @ 15% w/ Control	6.00	6.00	6.00	6.00	6.00	6.00	6.00
CO, lb/hr @ 15% w/ Control	21.91	13.78	23.40	14.89	17.22	18.79	30.92
CO, g/s @ 15% w/ Control	2.76	1.74	2.95	1.88	2.17	2.37	3.90
PM10 Emissions							
PM10, lb/h (front and back half catch)	11.70	7.36	12.00	7.79	8.99	10.04	18.00
PM10, g/s (front and back half catch)	1.47	0.93	1.51	0.98	1.13	1.27	2.27
Sulfur Oxide Emissions (as SO_2) [1]							
SO2, ppmvd @ 15% O2	0.12	0.12	0.12	0.12	0.12	0.12	0.12
SO2, lb/h	0.98	0.62	1.05	0.65	0.75	0.84	1.38
SO2, g/s @ 15% O2	0.12	0.08	0.13	0.08	0.09	0.11	0.17

1 Based on a maximum total sulfur content of 0.20 grains S/100 dscf NG

Magnolia Power Station
Westinghouse Stack Parameters and Emission Rates

Case Number	**1**	**2**	**3**	**4**	**Duct Fired**
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CTG Load	100%	100%	75%	75%	100%
Ambient Temperature, F	95	41	95	41	95
HRSG Firing	Unfired	Unfired	Unfired	Unfired	Fired
Exhaust Parameters					
Stack Exit Temperature, K	366.18	365.85	364.01	365.74	358.74
Stack Diameter, meters (estimated)	5.79	5.79	5.79	5.79	5.79
Stack Exit Velocity, m/s	17.64	19.01	15.12	16.57	18.45
Nitrogen Oxide Emissions					
NOx, ppmvd @ 15% w/ Control	2.00	2.00	2.00	2.00	2.00
NOx, lb/hr @ 15% w/ Control	12.70	13.70	9.50	10.70	18.05
NOx, g/s @ 15% w/ Control	1.60	1.73	1.20	1.35	2.27
Carbon Monoxide Emissions					
CO, ppmvd @ 15% w/ Control at BACT [1]	6.00	6.00	6.00	6.00	6.00
CO, lb/hr @ 15% w/ Control	15.20	16.60	13.30	14.60	27.48
CO, g/s @ 15% w/ Control	1.92	2.09	1.68	1.84	3.46
Particulate Matter (PM_{10})					
PM10, lb/h (front and back half catch)	11.13	12.00	8.38	9.37	18.00
PM10, g/s (front and back half catch)	1.402	1.512	1.056	1.181	2.268
Sulfur Oxide Emissions (as SO_2) [1]					
SOx, ppmvd @ 15% O2	0.15	0.15	0.15	0.15	0.12
SOx, lb/h	1.03	1.12	0.78	0.87	1.47
SOx, g/s @ 15% O2	0.13	0.14	0.10	0.11	0.19

URS

1 Based on a maximum total sulfur content of 0.20 grains S/100 dscf NG

APPENDIX H.9
SCREENING MODELING RESULTS

TABLE 4
Magnolia Power Project
General Electric (150 foot stack)

	Scen1	Scen3	Scen4	Scen6	Scen13	Scen14	Scen8SI
Load:	100%	45%	100%	45%	75%	75%	100%
Ambient Temperature (^oF):	95	95	41	41	95	41	95
Condition:	-----	-----	-----	-----	-----	-----	Steam Inj
X/Q (1-hour):	5.1944	6.8129	5.1835	6.8631	5.6189	5.3129	5.2012
X/Q (8-hour):	2.6306	3.1427	2.6023	3.1584	2.8324	2.7914	2.6481
X/Q (24-hour):	1.1874	1.4269	1.1752	1.4476	1.2609	1.2461	1.1910
X/Q (Annual):	0.1535	0.1885	0.1515	0.1891	0.1670	0.1638	0.1540
Carbon Monoxide							
Emissions (g/s):	2.3	1.45	2.46	1.56	1.81	1.97	3.25
	(ug/m^3)	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*
1-hour:	11.947	9.879	12.751	10.706	10.170	10.466	16.904
8-hour:	6.050	4.557	6.402	4.927	5.127	5.499	8.606
Nitrogen Dioxide							
Emissions (g/s):	1.54	0.95	1.68	1.01	1.18	1.32	2.13
	(ug/m^3)	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*
1-hour:	7.999	6.472	8.708	6.932	6.630	7.013	11.079
Annual:	0.236	0.179	0.254	0.191	0.197	0.216	0.328
Particulate Matter							
Emissions (g/s):	1.47	0.93	1.51	0.98	1.13	1.27	2.27
	(ug/m^3)	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*
24-hour:	1.751	1.323	1.777	1.421	1.428	1.576	2.701 (1)
Annual:	0.226	0.175	0.229	0.186	0.189	0.207	0.349
Sulfur Dioxide							
Emissions (g/s):	0.12	0.08	0.13	0.08	0.09	0.11	0.17
	(ug/m^3)	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*
1-Hour	0.641	0.532	0.686	0.562	0.531	0.562	0.904
24-hour:	0.147	0.111	0.155	0.119	0.119	0.132	0.207
Annual:	0.019	0.015	0.020	0.015	0.016	0.017	0.027

(1) Assumes duct firing occurs 24 hours/day. This assumption revised to a maximum of 12 hours/day duct firing in the refined analysis.

TABLE 5
Magnolia Power Project
Westinghouse (150 foot stack)

	Scen1	Scen2	Scen3	Scen4	Scen3SI
Load:	100%	100%	75%	75%	100%
Ambient Temperature (°F):	95	41	95	41	95
Condition:	-----	-----	-----	-----	Steam Inj
X/Q (1-hour):	5.1898	5.1707	5.2038	5.2040	5.2037
X/Q (8-hour):	2.6186	2.5694	2.7357	2.6640	2.6545
X/Q (24-hour):	1.1827	1.1623	1.2276	1.2007	1.1927
X/Q (Annual):	0.1528	0.1495	0.1600	0.1556	0.1543
Carbon Monoxide					
Emissions (g/s):	2.95	3.14	2.19	2.40	4.15
	(ug/m^3)	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*
1-hour:	15.291	16.223	11.375	12.487	21.620
8-hour:	7.716	8.061	5.980	6.392	11.029
Nitrogen Dioxide					
Emissions (g/s):	1.60	1.72	1.20	1.34	2.27
	(ug/m^3)	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*
1-hour:	8.304	8.894	6.245	6.973	11.812
Annual:	0.244	0.257	0.192	0.209	0.350
Particulate Matter					
Emissions (g/s):	1.40	1.51	1.06	1.18	2.27
	(ug/m^3)	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*
24-hour:	1.659	1.757	1.296	1.418	2.705 (1)
Annual:	0.214	0.226	0.169	0.184	0.350
Sulfur Dioxide					
Emissions (g/s):	0.13	0.14	0.10	0.11	0.19
	(ug/m^3)	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*	*(ug/m^3)*
1-hour	0.674	0.730	0.511	0.570	0.964
24-hour:	0.153	0.164	0.121	0.132	0.221
Annual:	0.020	0.021	0.016	0.017	0.029

(1) Assumes duct firing occurs 24 hours/day. This assumption revised to a maximum of 12 hours/day duct firing in the refined analysis.

Appendix H.10
Turbine and Cooling Tower Parameters
Refined Modeling Analysis

TURBINE AND COOLING TOWER STACK PARAMETERS USED IN THE REFINED MODELING ANLAYSIS

Source Description	Stack Height (meters)	Stack Diameter (meters)	Exhaust Temperature (K)	Exhaust Velocity (meters/second)
		1-Hour NO_x & CO Scenario		
Turbine Start-up[1]	45.72	5.79	353.24	11.13
Cooling Tower Cells	----	----	----	----
		3-Hour SO_x Scenario		
Turbine Start-up[1]	45.72	5.79	353.24	11.13
Cooling Tower Cells	----	----	----	----
		8-Hour & CO Scenario		
Turbine Start-up[1,2]	45.72	5.79	353.24	11.13
Cooling Tower Cells	----	----	----	----
		24-Hour SO_2 Scenario (WH)		
Turbine non-duct burning[3]	45.72	5.79	365.85	19.01
Turbine with duct burning[4]	45.72	5.79	358.74	18.45
Cooling Tower Cells	15.24	9.52	304.35	8.43
		24-Hour PM_{10} Scenario (WH)		
Turbine non-duct burning[3]	45.72	5.79	365.85	19.01
Turbine with duct burning[4]	45.72	5.79	358.74	18.45
Cooling Tower Cells	15.24	9.52	304.35	8.43
		24-Hour PM_{10} Scenario (GE)		
Turbine non-duct burning[3]	45.72	5.79	364.62	18.42
Turbine with duct burning[4]	45.72	5.79	360.18	18.26
Cooling Tower Cells	15.24	9.52	304.35	8.43
		Annual NO_x , PM_{10} and SO_2 Scenario (WH)		
Turbine Start-up/Shut Down[6]	45.72	5.79	353.24	11.13
Turbine non-duct burning[3]	45.72	5.79	365.85	19.01
Turbine with duct burning[4]	45.72	5.79	358.74	18.45
Cooling Tower Cells	15.24	9.52	304.35	8.43
Auxiliary Boiler	30.48	0.305	477.59	30.48
		Annual PM_{10} Scenario (GE)		
Turbine Start-up/Shut Down	45.72	5.79	353.24	11.13
Turbine non-duct burning[3]	45.72	5.79	364.62	18.42
Turbine with duct burning[4]	45.72	5.79	360.18	18.26
Cooling Tower Cells	15.24	9.52	304.35	8.43
Auxiliary Boiler	30.48	0.305	477.59	30.48

[1] Start-up stack parameters are based on GE 45% load and 41°F.
[2] Start-up stack parameters assumed to be conservative.
[3] Non duct firing assuming 100% load at 41°F.
[4] Duct firing assuming 100% load at 95°F.
[5] GE turbine parameters estimated maximum concentrations of PM_{10}.
[6] Start-up exit temperatures and flowrates based on GE at 45% load at 95°F.

APPENDIX H.11
FUMIGATION ANALYSIS RESULTS

Appendix H.11

Fumigation Modeling

Emission Rates

(Based on startups for stack parameters and maximum hourly emissions [startups included])

1-hr SO_x = 0.19 g/s
1-hr NO_x = 2.898 g/s (GE Scenario 45% load, 41° F)
1-hr CO = 35.91 g/s

Startup/Stack Parameters:

Stack HT = 150 ft = 45.72 m
Stack diameter = 19 ft = 5.79 m
Stack exit velocity = 11.35 m/s
Stack exit temp = 353.24 °K

03/14/01
15:58:12

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 95250 ***

Magnolia CO 1-hour Fumigation

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE              =        POINT
   EMISSION RATE (G/S)      =      35.9100
   STACK HEIGHT (M)         =      45.7200
   STK INSIDE DIAM (M)      =       5.7900
   STK EXIT VELOCITY (M/S)=        11.3500
   STK GAS EXIT TEMP (K)    =     353.2400
   AMBIENT AIR TEMP (K)     =     293.0000
   RECEPTOR HEIGHT (M)      =        .0000
   URBAN/RURAL OPTION       =        RURAL
   BUILDING HEIGHT (M)      =        .0000
   MIN HORIZ BLDG DIM (M) =          .0000
   MAX HORIZ BLDG DIM (M) =          .0000


BUOY. FLUX =  159.077 M**4/S**3;  MOM. FLUX =  895.543 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
50.	.1772E-13	5	1.0	1.7	10000.0	180.60	20.01	19.85	NO
100.	.5096E-03	5	1.0	1.7	10000.0	180.60	31.94	31.55	NO
200.	.9627E-01	5	1.0	1.7	10000.0	180.60	40.25	39.04	NO
300.	.1171	5	1.0	1.7	10000.0	180.60	42.08	39.51	NO
400.	.8175	1	3.0	3.3	960.0	288.64	101.09	81.78	NO
500.	10.26	1	3.0	3.3	960.0	288.64	122.33	114.62	NO
600.	30.54	1	3.0	3.3	960.0	288.64	142.98	162.74	NO
700.	40.51	1	3.0	3.3	960.0	288.64	163.16	221.21	NO
800.	47.42	1	1.5	1.7	532.6	531.55	213.88	310.58	NO
900.	58.65	1	1.5	1.7	532.6	531.55	235.21	388.61	NO
1000.	61.77	1	1.5	1.7	532.6	531.55	250.65	474.60	NO
1100.	60.19	1	1.5	1.7	532.6	531.55	266.07	572.38	NO
1200.	57.21	1	1.5	1.7	532.6	531.55	281.64	681.86	NO
1300.	54.23	1	1.5	1.7	532.6	531.55	297.33	802.92	NO
1400.	51.50	1	1.5	1.7	532.6	531.55	313.08	935.49	NO
1500.	49.03	1	1.5	1.7	532.6	531.55	328.88	1079.56	NO
1600.	46.78	1	1.5	1.7	532.6	531.55	344.70	1235.13	NO
1700.	44.72	1	1.5	1.7	532.6	531.55	360.54	1402.23	NO
1800.	42.84	1	1.5	1.7	532.6	531.55	376.36	1580.89	NO
1900.	41.11	1	1.5	1.7	532.6	531.55	392.17	1771.17	NO
2000.	39.52	1	1.5	1.7	532.6	531.55	407.96	1973.10	NO
2100.	38.05	1	1.5	1.7	532.6	531.55	423.72	2186.75	NO
2200.	36.69	1	1.5	1.7	532.6	531.55	439.44	2412.15	NO
2300.	35.43	1	1.5	1.7	532.6	531.55	455.13	2649.37	NO
2400.	34.25	1	1.5	1.7	532.6	531.55	470.78	2898.45	NO
2500.	33.15	1	1.5	1.7	532.6	531.55	486.38	3159.45	NO
2600.	32.12	1	1.5	1.7	532.6	531.55	501.94	3432.42	NO
2700.	31.31	2	1.5	1.7	532.6	531.55	397.84	353.39	NO
2800.	31.70	2	1.5	1.7	532.6	531.55	409.28	365.60	NO
2900.	31.94	2	1.5	1.7	532.6	531.55	420.71	377.91	NO
3000.	32.05	2	1.5	1.7	532.6	531.55	432.12	390.33	NO
3500.	31.14	2	1.5	1.7	532.6	531.55	488.94	453.79	NO
4000.	29.03	2	1.5	1.7	532.6	531.55	545.28	519.10	NO
4500.	26.69	2	1.5	1.7	532.6	531.55	601.07	585.87	NO
5000.	24.54	2	1.5	1.7	532.6	531.55	656.32	653.84	NO

5500.	22.87	3	1.5	1.7	510.9	509.90	498.96	319.56	NO
6000.	23.34	3	1.5	1.7	510.9	509.90	536.63	341.62	NO
6500.	23.39	3	1.5	1.7	510.9	509.90	574.10	363.77	NO
7000.	23.13	3	1.5	1.7	510.9	509.90	611.37	385.99	NO
7500.	22.64	3	1.5	1.7	510.9	509.90	648.43	408.25	NO
8000.	22.02	3	1.5	1.7	510.9	509.90	685.30	430.52	NO
8500.	21.32	3	1.5	1.7	510.9	509.90	721.96	452.80	NO
9000.	21.55	5	1.0	1.7	10000.0	180.60	372.44	84.30	NO
9500.	22.17	5	1.0	1.7	10000.0	180.60	390.65	86.15	NO
10000.	22.69	5	1.0	1.7	10000.0	180.60	408.74	87.96	NO
15000.	23.99	5	1.0	1.7	10000.0	180.60	584.66	103.04	NO
20000.	22.84	5	1.0	1.7	10000.0	180.60	753.31	115.90	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 50. M:

1002.	61.77	1	1.5	1.7	532.6	531.55	251.11	477.36	NO

```
DWASH=   MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

*** INVERSION BREAK-UP FUMIGATION CALC. ***
 CONC (UG/M**3)   =    63.49
 DIST TO MAX (M)  = 12385.51

    ***************************************
    *** SUMMARY OF SCREEN MODEL RESULTS ***
    ***************************************
```

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	61.77	1002.	0.
INV BREAKUP FUMI	63.49	12386.	--

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****************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****************************************************
```

03/14/01
16:06:36

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 95250 ***

Magnolia SO2 1-hour Fumigation

```
SIMPLE TERRAIN INPUTS:
   SOURCE TYPE             =        POINT
   EMISSION RATE (G/S)     =      .190000
   STACK HEIGHT (M)        =      45.7200
   STK INSIDE DIAM (M)     =       5.7900
   STK EXIT VELOCITY (M/S)=       11.3500
   STK GAS EXIT TEMP (K)   =     353.2400
   AMBIENT AIR TEMP (K)    =     293.0000
   RECEPTOR HEIGHT (M)     =        .0000
   URBAN/RURAL OPTION      =        RURAL
   BUILDING HEIGHT (M)     =        .0000
   MIN HORIZ BLDG DIM (M)  =        .0000
   MAX HORIZ BLDG DIM (M)  =        .0000

BUOY. FLUX =  159.077 M**4/S**3;  MOM. FLUX =  895.543 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF     0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
50.	.9374E-16	5	1.0	1.7	10000.0	180.60	20.01	19.85	NO
100.	.2696E-05	5	1.0	1.7	10000.0	180.60	31.94	31.55	NO
200.	.5093E-03	5	1.0	1.7	10000.0	180.60	40.25	39.04	NO
300.	.6194E-03	5	1.0	1.7	10000.0	180.60	42.08	39.51	NO
400.	.4326E-02	1	3.0	3.3	960.0	288.64	101.09	81.78	NO
500.	.5427E-01	1	3.0	3.3	960.0	288.64	122.33	114.62	NO
600.	.1616	1	3.0	3.3	960.0	288.64	142.98	162.74	NO
700.	.2144	1	3.0	3.3	960.0	288.64	163.16	221.21	NO
800.	.2509	1	1.5	1.7	532.6	531.55	213.88	310.58	NO
900.	.3103	1	1.5	1.7	532.6	531.55	235.21	388.61	NO
1000.	.3268	1	1.5	1.7	532.6	531.55	250.65	474.60	NO
1100.	.3185	1	1.5	1.7	532.6	531.55	266.07	572.38	NO
1200.	.3027	1	1.5	1.7	532.6	531.55	281.64	681.86	NO
1300.	.2869	1	1.5	1.7	532.6	531.55	297.33	802.92	NO
1400.	.2725	1	1.5	1.7	532.6	531.55	313.08	935.49	NO
1500.	.2594	1	1.5	1.7	532.6	531.55	328.88	1079.56	NO
1600.	.2475	1	1.5	1.7	532.6	531.55	344.70	1235.13	NO
1700.	.2366	1	1.5	1.7	532.6	531.55	360.54	1402.23	NO
1800.	.2267	1	1.5	1.7	532.6	531.55	376.36	1580.89	NO
1900.	.2175	1	1.5	1.7	532.6	531.55	392.17	1771.17	NO
2000.	.2091	1	1.5	1.7	532.6	531.55	407.96	1973.10	NO
2100.	.2013	1	1.5	1.7	532.6	531.55	423.72	2186.75	NO
2200.	.1941	1	1.5	1.7	532.6	531.55	439.44	2412.15	NO
2300.	.1874	1	1.5	1.7	532.6	531.55	455.13	2649.37	NO
2400.	.1812	1	1.5	1.7	532.6	531.55	470.78	2898.45	NO
2500.	.1754	1	1.5	1.7	532.6	531.55	486.38	3159.45	NO
2600.	.1700	1	1.5	1.7	532.6	531.55	501.94	3432.42	NO
2700.	.1657	2	1.5	1.7	532.6	531.55	397.84	353.39	NO
2800.	.1677	2	1.5	1.7	532.6	531.55	409.28	365.60	NO
2900.	.1690	2	1.5	1.7	532.6	531.55	420.71	377.91	NO
3000.	.1696	2	1.5	1.7	532.6	531.55	432.12	390.33	NO
3500.	.1648	2	1.5	1.7	532.6	531.55	488.94	453.79	NO
4000.	.1536	2	1.5	1.7	532.6	531.55	545.28	519.10	NO
4500.	.1412	2	1.5	1.7	532.6	531.55	601.07	585.87	NO
5000.	.1298	2	1.5	1.7	532.6	531.55	656.32	653.84	NO

5500.	.1210	3	1.5	1.7	510.9	509.90	498.96	319.56	NO
6000.	.1235	3	1.5	1.7	510.9	509.90	536.63	341.62	NO
6500.	.1238	3	1.5	1.7	510.9	509.90	574.10	363.77	NO
7000.	.1224	3	1.5	1.7	510.9	509.90	611.37	385.99	NO
7500.	.1198	3	1.5	1.7	510.9	509.90	648.43	408.25	NO
8000.	.1165	3	1.5	1.7	510.9	509.90	685.30	430.52	NO
8500.	.1128	3	1.5	1.7	510.9	509.90	721.96	452.80	NO
9000.	.1140	5	1.0	1.7	10000.0	180.60	372.44	84.30	NO
9500.	.1173	5	1.0	1.7	10000.0	180.60	390.65	86.15	NO
10000.	.1201	5	1.0	1.7	10000.0	180.60	408.74	87.96	NO
15000.	.1269	5	1.0	1.7	10000.0	180.60	584.66	103.04	NO
20000.	.1209	5	1.0	1.7	10000.0	180.60	753.31	115.90	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 50. M:

1002.	.3268	1	1.5	1.7	532.6	531.55	251.11	477.36	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

*** INVERSION BREAK-UP FUMIGATION CALC. ***
CONC (UG/M**3) = .3359
DIST TO MAX (M) = 12385.51

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	.3268	1002.	0.
INV BREAKUP FUMI	.3359	12386.	--

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

03/14/01
16:00:16

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 95250 ***

Magnolia NOx 1-hour Fumigation

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	2.89800
STACK HEIGHT (M)	=	45.7200
STK INSIDE DIAM (M)	=	5.7900
STK EXIT VELOCITY (M/S)	=	11.3500
STK GAS EXIT TEMP (K)	=	353.2400
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	.0000
URBAN/RURAL OPTION	=	RURAL
BUILDING HEIGHT (M)	=	.0000
MIN HORIZ BLDG DIM (M)	=	.0000
MAX HORIZ BLDG DIM (M)	=	.0000

BUOY. FLUX = 159.077 M**4/S**3; MOM. FLUX = 895.543 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
50.	.1430E-14	5	1.0	1.7	10000.0	180.60	20.01	19.85	NO
100.	.4113E-04	5	1.0	1.7	10000.0	180.60	31.94	31.55	NO
200.	.7769E-02	5	1.0	1.7	10000.0	180.60	40.25	39.04	NO
300.	.9447E-02	5	1.0	1.7	10000.0	180.60	42.08	39.51	NO
400.	.6598E-01	1	3.0	3.3	960.0	288.64	101.09	81.78	NO
500.	.8278	1	3.0	3.3	960.0	288.64	122.33	114.62	NO
600.	2.465	1	3.0	3.3	960.0	288.64	142.98	162.74	NO
700.	3.270	1	3.0	3.3	960.0	288.64	163.16	221.21	NO
800.	3.827	1	1.5	1.7	532.6	531.55	213.88	310.58	NO
900.	4.733	1	1.5	1.7	532.6	531.55	235.21	388.61	NO
1000.	4.985	1	1.5	1.7	532.6	531.55	250.65	474.60	NO
1100.	4.858	1	1.5	1.7	532.6	531.55	266.07	572.38	NO
1200.	4.617	1	1.5	1.7	532.6	531.55	281.64	681.86	NO
1300.	4.376	1	1.5	1.7	532.6	531.55	297.33	802.92	NO
1400.	4.156	1	1.5	1.7	532.6	531.55	313.08	935.49	NO
1500.	3.956	1	1.5	1.7	532.6	531.55	328.88	1079.56	NO
1600.	3.775	1	1.5	1.7	532.6	531.55	344.70	1235.13	NO
1700.	3.609	1	1.5	1.7	532.6	531.55	360.54	1402.23	NO
1800.	3.457	1	1.5	1.7	532.6	531.55	376.36	1580.89	NO
1900.	3.318	1	1.5	1.7	532.6	531.55	392.17	1771.17	NO
2000.	3.190	1	1.5	1.7	532.6	531.55	407.96	1973.10	NO
2100.	3.071	1	1.5	1.7	532.6	531.55	423.72	2186.75	NO
2200.	2.961	1	1.5	1.7	532.6	531.55	439.44	2412.15	NO
2300.	2.859	1	1.5	1.7	532.6	531.55	455.13	2649.37	NO
2400.	2.764	1	1.5	1.7	532.6	531.55	470.78	2898.45	NO
2500.	2.675	1	1.5	1.7	532.6	531.55	486.38	3159.45	NO
2600.	2.592	1	1.5	1.7	532.6	531.55	501.94	3432.42	NO
2700.	2.527	2	1.5	1.7	532.6	531.55	397.84	353.39	NO
2800.	2.558	2	1.5	1.7	532.6	531.55	409.28	365.60	NO
2900.	2.578	2	1.5	1.7	532.6	531.55	420.71	377.91	NO
3000.	2.586	2	1.5	1.7	532.6	531.55	432.12	390.33	NO
3500.	2.513	2	1.5	1.7	532.6	531.55	488.94	453.79	NO
4000.	2.342	2	1.5	1.7	532.6	531.55	545.28	519.10	NO
4500.	2.154	2	1.5	1.7	532.6	531.55	601.07	585.87	NO
5000.	1.980	2	1.5	1.7	532.6	531.55	656.32	653.84	NO

```
   5500.   1.846         3      1.5     1.7    510.9  509.90  498.96  319.56    NO
   6000.   1.884         3      1.5     1.7    510.9  509.90  536.63  341.62    NO
   6500.   1.888         3      1.5     1.7    510.9  509.90  574.10  363.77    NO
   7000.   1.866         3      1.5     1.7    510.9  509.90  611.37  385.99    NO
   7500.   1.827         3      1.5     1.7    510.9  509.90  648.43  408.25    NO
   8000.   1.777         3      1.5     1.7    510.9  509.90  685.30  430.52    NO
   8500.   1.721         3      1.5     1.7    510.9  509.90  721.96  452.80    NO
   9000.   1.739         5      1.0     1.7 10000.0  180.60  372.44   84.30    NO
   9500.   1.789         5      1.0     1.7 10000.0  180.60  390.65   86.15    NO
  10000.   1.832         5      1.0     1.7 10000.0  180.60  408.74   87.96    NO
  15000.   1.936         5      1.0     1.7 10000.0  180.60  584.66  103.04    NO
  20000.   1.843         5      1.0     1.7 10000.0  180.60  753.31  115.90    NO

 MAXIMUM 1-HR CONCENTRATION AT OR BEYOND     50. M:
   1002.   4.985         1      1.5     1.7    532.6  531.55  251.11  477.36    NO

  DWASH=   MEANS NO CALC MADE (CONC = 0.0)
  DWASH=NO MEANS NO BUILDING DOWNWASH USED
  DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
  DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
  DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

  *** INVERSION BREAK-UP FUMIGATION CALC. ***
   CONC (UG/M**3)   =     5.124
   DIST TO MAX (M)  = 12385.51

      ***************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ***************************************

 CALCULATION       MAX CONC    DIST TO   TERRAIN
  PROCEDURE       (UG/M**3)    MAX (M)    HT (M)
--------------   -----------   -------   -------
SIMPLE TERRAIN    4.985          1002.        0.

INV BREAKUP FUMI  5.124         12386.       --

***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************
```

COMMISSIONING EMISSIONS AND MODELING ANALYSIS

Maximum Monthly Commissioning Emissions.

Combustion Turbine Commissioning Emissions

Maximum Hourly Emissions:

Maximum NO_x emissions = 192.14 lb/hr
Maximum CO emissions = 200.00 lb/hr
Maximum VOC emissions = 13.64 lb/hr

Maximum PM_{10} and SO_2 emissions were based on maximum operating emissions scenarios.

PM_{10} maximum hourly emission rate = 18.00 lb/hr (Westinghouse duct fired)
SO_2 maximum hourly emission rate = 1.47 lb/hr (Westinghouse duct fired)

Monthly Emissions

Totals provided in Table H.12-1

NO_x = 6,516 lbs of NO_x
CO = 13,148 lbs of CO
VOC = 2,248 lbs VOC

Estimate based on 143 hours to complete tasks 1-7

PM_{10} = 143 hours x 18.00 lbs/hr = 2,574 lbs
SO_2 = 143 hours x 1.47 lbs/hr = 210 lbs

Cooling Tower Emissions

Estimate based on 143 hours to complete tasks 1-7

PM_{10} = 143 hours x 0.0503 lbs/hr-cell x 6 cells = 43 lbs

Average Daily Emissions

NO_x = 6,516 lbs of NO_x / 30 days = 217 lbs NO_x / day
CO = 13,148 lbs of CO / 30 days = 438 lbs CO / day
VOC = 2,248 lbs VOC / 30 days = 75 lbs VOC / day
PM_{10} = 2,574 lbs PM_{10} / 30 days = 86 lbs PM_{10} / day
SO_2 = 210 lbs SO_2 / 30 days = 7 lbs SO_2 / day

Total Commissioning Activities

Total Emissions (Start-up tasks 1-12)

Totals provided H.12-1

NOx = 14,142 lbs of NOx
CO = 24,817 lbs of CO
VOC = 4,591 lbs VOC

Estimate based on 636 hours to complete tasks 1-12

PM_{10} = 636 hours x 18.00 lbs/hr = 11,448 lbs
SO_2 = 636 hours x 1.47 lbs/hr = 935 lbs

Note: Estimate does not alter maximum hourly emissions

Cooling Tower Emissions

PM_{10} = 636 hours x 0.0503 lbs/hr-cell x 6 cells = 192 lbs PM_{10}

Commissioning Modeling Stack Parameters

Stack height = 45.72 m (150 ft)
Stack diameter = 5.79 m (19 ft)
Stack gas exit temperature = 353.24 °K
Stack gas exit velocity = 11.13 m/s

Note: Stack exit velocity and temperature based on the GE 45 % load case at 41°F.
Downwash included in the dispersion modeling analysis.

APPENDIX H.12

Magnolia Power Plant Expansion Project
Total Emissions Estimates for Commissioning, Rev.1
B&V project 99523.0150
March 2, 2001

Startup Task	Total CC Starts per Task			Total NOx Emissions per Start, lbm			Total CO Emissions per Start, lbm			Total VOC Emissions per Start, lbm			Average CTG Load	NOx lb/hr	CO lb/hr	VOC lb/hr	Total Hrs of Operation	NOx lb	CO lb	VOC lb
	Transient Operation												**Steady State Operation**					**TOTAL EMISSIONS**		
	Cold	Warm	Hot	Cold	Warm	Hot	Cold	Warm	Hot	Cold	Warm	Hot								
1st Seven Weeks																				
1 First Fire	1			296.3	16.9	35.2	609.7	245.8	532.9	56.0	35.0	76.2	10%	159.09	200.00	4.31	3	774	1210	69
2 Install SCR Catalyst		1		430.3	226.9	58.5	843.3	505.2	553.2	96.2	57.9	78.8	0%	10.65	6.41	1.89	0	227	505	58
3 Full Speed, No Load, and First Sync	1		1	296.3	16.9	35.2	609.7	245.8	532.9	56.0	35.0	76.2	10%	159.09	200.00	4.31	8	1604	2743	167
4 Emission/Pulsation Tune		1	1	429.2	224.7	57.3	841.4	493.3	550.2	96.0	57.1	78.5	40%	6.73	178.16	9.18	8	336	2469	209
5 Low Load		1	1	419.9	172.5	42.0	835.5	464.3	541.0	95.5	54.0	77.6	20%	192.14	77.77	13.64	4	983	1316	186
6 Steam Blows (with duct firing)	1	1		430.3	226.9	58.5	847.9	509.7	557.8	98.8	60.5	81.4	100%	10.65	19.41	11.15	110	1828	3492	1386
7 Condenser Bypass Test (no duct firing)	1	1		430.3	226.9	58.5	843.3	505.2	553.2	96.2	57.9	78.8	100%	10.65	6.41	1.89	10	764	1413	173
8 STG Commissioning	1	1	1	429.7	225.9	57.9	843.0	504.6	552.9	96.1	57.7	78.7	70%	8.69	5.08	1.58	72	1339	2266	346
9 Power Train Optimization & Tuning		1		429.9	226.2	58.1	843.1	504.8	553.0	96.1	57.7	78.7	80%	9.34	5.51	1.68	40	600	725	125
10 Full Load Performance and CEMS Cert.		2	1	430.3	226.9	58.5	843.3	505.2	553.2	96.2	57.9	78.8	100%	10.65	6.41	1.89	327	3994	3658	813
with duct firing			1	430.3	226.9	58.5	847.9	509.7	557.8	98.8	60.5	81.4	100%	10.65	19.41	11.15	40	426	776	446
11 Full Load Rejection Testing		1	1	430.3	226.9	58.5	843.3	505.2	553.2	96.2	57.9	78.8	100%	10.65	6.41	1.89	3	317	1078	142
with duct firing			1	430.3	226.9	58.5	847.9	509.7	557.8	98.8	60.5	81.4	100%	10.65	19.41	11.15	3	90	616	115
12 Full Load Run Back	1	1	1	430.3	226.9	58.5	843.3	505.2	553.2	96.2	57.9	78.8	100%	10.65	6.41	1.89	5	769	1934	242
with duct firing			1	430.3	226.9	58.5	847.9	509.7	557.8	98.8	60.5	81.4	100%	10.65	19.41	11.15	3	90	616	115
																Per Turbine Total		14,142	24,817	4,591
																Total Hrs of Operation	636			

The emissions estimates shown in the table above include the effects of a CO catalyst reducing CO levels to 6 ppm and VOC levels by 30%, and SCR reducing NOx levels to 2 ppm. The SCR effects are assumed to begin taking effect when the CTG is at 40% of base load, and the CO catalyst at 11% CTG load.

The emissions estimates shown in the table above are based on Black & Veatch estimates of 7FA gas turbine performance during transient operation, on typical 1x1 combined cycle plant start-up curves, and plant start-up procedures for Black & Veatch projects. The estimates cannot be guaranteed.

The first month of the commissioning phase is passed after Task 8.

Total start-up emissions during transient operation are defined as uncontrolled emissions from zero load to the average CTG load as indicated in the table for steady state operation.

Ambient temperature for steady state operation is assumed to be 95oF.

Emission estimates do not include cooling tower or emergency generator.

Appendix H.12
Commissioning Emissions and Modeling Results

Pollutant	Emissions		Concentrations (μg/m³)					
			1-Hour Average			8-Hour Average		
	(g/s)	(lb/hr)	Modeled	Background	Total	Modeled	Background	Total
CO	25.2	200	174	10488	10662	85.1	10180	10265
NO_2	24.2	192	167	376	543	----	----	----

APPENDIX H.13
AMMONIA SLIP EMISSIONS CALCULATIONS

AMMONIA SLIP EMISSIONS CALCULATIONS

AMMONIA SLIP LIMIT:

NH_3 emission concentration limit:	5 ppmvd @ 15% O_2
Standard Temperature:	60°F (SCAQMD Regulations)

WESTINGHOUSE 501F

Annual Runs: Cancer Risk and Chronic Hazard Index

- **No Steam Injection:**

100% load, 95°F ambient temperature:	(Source: Black & Veatch, December 7, 2000)
Wet Gas Flow Rate:	984,447 acfm
Stack Moisture Content:	9.87%
Stack Oxygen Content:	12.06%
Stack Temperature:	199.4°F

The exhaust gas oxygen content on a dry basis:

[(984,447 acfm)(0.1206)]/[(984,447 acfm)(1- 0.0987)] = 13.38% O_2, dry

Correcting the flow rate to standard conditions yields:

(984,447 acfm)([60 + 460]/[199.4 + 460])(1 – 0.0987) = 699,707 dscfm

(5 ppmvd)(20.95 – 13.38)/(20.95 – 15) = 6.36 ppmvd @ 13.38% O_2, dry

(6.36 ppmvd/10^6)(699,707 dscfm)(60 min/hr)(lbmol/379 dscf)(17 lb NH_3/lbmol) = **11.98 lb NH_3/hr**

- **Steam Injection:**

100% load, 95°F ambient temperature:	(Source: Black & Veatch, December 7, 2000)
Wet Gas Flow Rate:	1,029,720 acfm
Stack Moisture Content:	14.81%
Stack Oxygen Content:	10.94%
Stack Temperature:	186°F

The exhaust gas oxygen content on a dry basis:

[(1,029,720 acfm)(0.1481)]/[(1,029,720 acfm)(1- 0.1094)] = 16.63% O_2, dry

Correcting the flow rate to standard conditions yields:

(1,029,720 acfm)([60 + 460]/[186 + 460])(1 – 0.1094) = 738,198 dscfm

(5 ppmvd)(20.95 – 16.63)/(20.95 – 15) = 3.63 ppmvd @ 16.63% O_2, dry

(3.63 ppmvd/10^6)(738,198 dscfm)(60 min/hr)(lbmol/379 dscf)(17 lb NH_3/lbmol) = **7.21 lb NH_3/hr**

WESTINGHOUSE 501F

Maximum Hourly Runs: Acute Hazard Index

100% load, 41°F ambient temperature	(Source: Black & Veatch, December 7, 2000)
Wet Gas Flow Rate:	1,061,023 acfm
Stack Moisture Content:	8.51%
Stack Oxygen Content:	12.34%
Stack Temperature:	198.8°F

The exhaust gas oxygen content on a dry basis:

[(1,061,023 acfm)(0.1234)]/[(1,061,023 acfm)(1- 0.0851)] = 13.49% O_2, dry

Correcting the flow rate to standard conditions yields:

(1,061,023 acfm)([60 + 460]/[198.8 + 460])(1 – 0.0851) = 766,211 dscfm

(5 ppmvd)(20.95 – 13.49)/(20.95 – 15) = 6.27 ppmvd @ 13.49% O_2, dry

(6.27 ppmvd/10^6)(766,211 dscfm)(60 min/hr)(lbmol/379 dscf)(17 lb NH_3/lbmol) = **12.93 lb NH_3/hr**

APPENDIX H.14
SCREENING MODELING OUTPUT FILES

02/28/01
13:28:06

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

Magnolia Power Plant Expansion Project NH3 Unloading Spill (F 1.5 m/s)

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	AREA
EMISSION RATE (G/(S-M**2))	=	1.00000
SOURCE HEIGHT (M)	=	.0000
LENGTH OF LARGER SIDE (M)	=	.2252
LENGTH OF SMALLER SIDE (M)	=	.2252
RECEPTOR HEIGHT (M)	=	.0000
URBAN/RURAL OPTION	=	RURAL

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = .000 M**4/S**2.

*** STABILITY CLASS 6 ONLY ***
*** ANEMOMETER HEIGHT WIND SPEED OF 1.50 M/S ONLY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
1.	.9510E+06	6	1.5	1.5	10000.0	.00	45.
100.	1135.	6	1.5	1.5	10000.0	.00	43.
200.	339.5	6	1.5	1.5	10000.0	.00	33.
300.	170.0	6	1.5	1.5	10000.0	.00	31.
400.	104.1	6	1.5	1.5	10000.0	.00	38.
500.	71.19	6	1.5	1.5	10000.0	.00	36.
600.	52.23	6	1.5	1.5	10000.0	.00	38.
700.	40.20	6	1.5	1.5	10000.0	.00	38.
800.	32.45	6	1.5	1.5	10000.0	.00	38.
900.	26.89	6	1.5	1.5	10000.0	.00	38.
1000.	22.72	6	1.5	1.5	10000.0	.00	35.
1100.	19.62	6	1.5	1.5	10000.0	.00	41.
1200.	17.15	6	1.5	1.5	10000.0	.00	33.
1300.	15.15	6	1.5	1.5	10000.0	.00	33.
1400.	13.52	6	1.5	1.5	10000.0	.00	41.
1500.	12.15	6	1.5	1.5	10000.0	.00	33.
1600.	11.00	6	1.5	1.5	10000.0	.00	41.
1700.	10.02	6	1.5	1.5	10000.0	.00	33.
1800.	9.175	6	1.5	1.5	10000.0	.00	33.
1900.	8.444	6	1.5	1.5	10000.0	.00	41.
2000.	7.808	6	1.5	1.5	10000.0	.00	35.
2100.	7.273	6	1.5	1.5	10000.0	.00	35.

2200.	6.802	6	1.5	1.5	10000.0	.00	31.
2300.	6.377	6	1.5	1.5	10000.0	.00	31.
2400.	5.992	6	1.5	1.5	10000.0	.00	35.
2500.	5.647	6	1.5	1.5	10000.0	.00	35.
2600.	5.335	6	1.5	1.5	10000.0	.00	35.
2700.	5.054	6	1.5	1.5	10000.0	.00	31.
2800.	4.795	6	1.5	1.5	10000.0	.00	31.
2900.	4.554	6	1.5	1.5	10000.0	.00	35.
3000.	4.335	6	1.5	1.5	10000.0	.00	38.
3500.	3.511	6	1.5	1.5	10000.0	.00	35.
4000.	2.926	6	1.5	1.5	10000.0	.00	35.
4500.	2.495	6	1.5	1.5	10000.0	.00	40.
5000.	2.161	6	1.5	1.5	10000.0	.00	40.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

1.	.1739E+07	6	1.5	1.5	10000.0	.00	42.

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
5.	.2078E+06	6	1.5	1.5	10000.0	.00	44.
10.	.6307E+05	6	1.5	1.5	10000.0	.00	41.
15.	.3114E+05	6	1.5	1.5	10000.0	.00	42.
20.	.1884E+05	6	1.5	1.5	10000.0	.00	31.
25.	.1276E+05	6	1.5	1.5	10000.0	.00	31.
30.	9281.	6	1.5	1.5	10000.0	.00	31.
36.	6749.	6	1.5	1.5	10000.0	.00	39.
40.	5614.	6	1.5	1.5	10000.0	.00	39.
50.	3802.	6	1.5	1.5	10000.0	.00	31.
60.	2765.	6	1.5	1.5	10000.0	.00	31.
70.	2113.	6	1.5	1.5	10000.0	.00	43.
80.	1674.	6	1.5	1.5	10000.0	.00	39.
90.	1363.	6	1.5	1.5	10000.0	.00	39.
110.	961.0	6	1.5	1.5	10000.0	.00	39.
120.	825.8	6	1.5	1.5	10000.0	.00	43.
130.	718.4	6	1.5	1.5	10000.0	.00	39.
140.	631.4	6	1.5	1.5	10000.0	.00	39.
150.	560.0	6	1.5	1.5	10000.0	.00	39.
160.	500.5	6	1.5	1.5	10000.0	.00	39.
170.	450.4	6	1.5	1.5	10000.0	.00	39.
180.	407.7	6	1.5	1.5	10000.0	.00	39.
190.	371.1	6	1.5	1.5	10000.0	.00	39.
225.	277.6	6	1.5	1.5	10000.0	.00	39.
250.	231.9	6	1.5	1.5	10000.0	.00	31.
275.	197.1	6	1.5	1.5	10000.0	.00	38.
325.	148.3	6	1.5	1.5	10000.0	.00	31.
350.	130.7	6	1.5	1.5	10000.0	.00	38.
375.	116.2	6	1.5	1.5	10000.0	.00	31.
425.	93.89	6	1.5	1.5	10000.0	.00	31.
450.	85.18	6	1.5	1.5	10000.0	.00	31.
475.	77.68	6	1.5	1.5	10000.0	.00	38.

```
***************************************
*** SUMMARY OF SCREEN MODEL RESULTS ***
***************************************

 CALCULATION         MAX CONC     DIST TO    TERRAIN
  PROCEDURE         (UG/M**3)     MAX (M)     HT (M)
--------------     -----------   -------    -------
SIMPLE TERRAIN      .1739E+07         1.         0.

***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
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02/28/01
12:07:04

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

Magnolia Power Plant Expansion Project NH3 Unloading Spill (D 1.3 m/s)

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	AREA
EMISSION RATE (G/(S-M**2))	=	1.00000
SOURCE HEIGHT (M)	=	.0000
LENGTH OF LARGER SIDE (M)	=	.2252
LENGTH OF SMALLER SIDE (M)	=	.2252
RECEPTOR HEIGHT (M)	=	.0000
URBAN/RURAL OPTION	=	RURAL

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = .000 M**4/S**2.

*** STABILITY CLASS 4 ONLY ***
*** ANEMOMETER HEIGHT WIND SPEED OF 1.30 M/S ONLY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
1.	.4833E+06	4	1.3	1.3	416.0	.00	32.
100.	324.8	4	1.3	1.3	416.0	.00	29.
200.	93.66	4	1.3	1.3	416.0	.00	33.
300.	45.31	4	1.3	1.3	416.0	.00	27.
400.	27.55	4	1.3	1.3	416.0	.00	38.
500.	18.73	4	1.3	1.3	416.0	.00	28.
600.	13.68	4	1.3	1.3	416.0	.00	38.
700.	10.48	4	1.3	1.3	416.0	.00	38.
800.	8.327	4	1.3	1.3	416.0	.00	38.
900.	6.798	4	1.3	1.3	416.0	.00	38.
1000.	6.679	4	1.3	1.3	416.0	.00	7.
1100.	4.890	4	1.3	1.3	416.0	.00	41.
1200.	4.270	4	1.3	1.3	416.0	.00	33.
1300.	3.770	4	1.3	1.3	416.0	.00	33.
1400.	3.361	4	1.3	1.3	416.0	.00	41.
1500.	3.019	4	1.3	1.3	416.0	.00	33.
1600.	2.732	4	1.3	1.3	416.0	.00	41.
1700.	2.486	4	1.3	1.3	416.0	.00	33.
1800.	2.275	4	1.3	1.3	416.0	.00	33.
1900.	2.092	4	1.3	1.3	416.0	.00	41.
2000.	3.300	4	1.3	1.3	416.0	.00	11.
2100.	1.792	4	1.3	1.3	416.0	.00	35.

2200.	1.669	4	1.3	1.3	416.0	.00	31.
2300.	1.558	4	1.3	1.3	416.0	.00	31.
2400.	1.457	4	1.3	1.3	416.0	.00	38.
2500.	1.368	4	1.3	1.3	416.0	.00	35.
2600.	1.288	4	1.3	1.3	416.0	.00	35.
2700.	1.215	4	1.3	1.3	416.0	.00	31.
2800.	1.149	4	1.3	1.3	416.0	.00	31.
2900.	1.087	4	1.3	1.3	416.0	.00	35.
3000.	1.032	4	1.3	1.3	416.0	.00	38.
3500.	.8179	4	1.3	1.3	416.0	.00	35.
4000.	1.595	4	1.3	1.3	416.0	.00	8.
4500.	.5611	4	1.3	1.3	416.0	.00	40.
5000.	.4789	4	1.3	1.3	416.0	.00	27.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

1.	.8029E+06	4	1.3	1.3	416.0	.00	41.

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
5.	.7146E+05	4	1.3	1.3	416.0	.00	41.
10.	.2053E+05	4	1.3	1.3	416.0	.00	27.
15.	9883.	4	1.3	1.3	416.0	.00	29.
20.	5882.	4	1.3	1.3	416.0	.00	31.
25.	3934.	4	1.3	1.3	416.0	.00	29.
30.	2832.	4	1.3	1.3	416.0	.00	29.
36.	2040.	4	1.3	1.3	416.0	.00	39.
40.	1687.	4	1.3	1.3	416.0	.00	39.
50.	1129.	4	1.3	1.3	416.0	.00	31.
60.	813.4	4	1.3	1.3	416.0	.00	31.
70.	616.5	4	1.3	1.3	416.0	.00	29.
80.	485.0	4	1.3	1.3	416.0	.00	39.
90.	392.5	4	1.3	1.3	416.0	.00	39.
110.	273.7	4	1.3	1.3	416.0	.00	39.
120.	234.1	4	1.3	1.3	416.0	.00	29.
130.	202.8	4	1.3	1.3	416.0	.00	29.
140.	177.6	4	1.3	1.3	416.0	.00	39.
150.	156.9	4	1.3	1.3	416.0	.00	29.
160.	139.7	4	1.3	1.3	416.0	.00	29.
170.	125.3	4	1.3	1.3	416.0	.00	39.
180.	113.1	4	1.3	1.3	416.0	.00	29.
190.	102.7	4	1.3	1.3	416.0	.00	29.
225.	75.84	4	1.3	1.3	416.0	.00	29.
250.	62.80	4	1.3	1.3	416.0	.00	29.
275.	52.95	4	1.3	1.3	416.0	.00	38.
325.	39.45	4	1.3	1.3	416.0	.00	31.
350.	34.70	4	1.3	1.3	416.0	.00	27.
375.	30.80	4	1.3	1.3	416.0	.00	31.
425.	24.81	4	1.3	1.3	416.0	.00	31.
450.	22.48	4	1.3	1.3	416.0	.00	27.
475.	20.47	4	1.3	1.3	416.0	.00	27.

```
***************************************
*** SUMMARY OF SCREEN MODEL RESULTS ***
***************************************

 CALCULATION         MAX CONC     DIST TO    TERRAIN
  PROCEDURE         (UG/M**3)     MAX (M)     HT (M)
--------------     -----------   -------    -------
SIMPLE TERRAIN       .8029E+06        1.         0.

***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
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APPENDIX H.15
CUMULATIVE IMPACTS ANALYSIS PROTOCOL

CUMULATIVE IMPACTS ANALYSIS PROTOCOL

Potential cumulative air quality impacts that might be expected to occur, resulting from the Project and other reasonably foreseeable projects, are both regional and localized in nature. These cumulative impacts will be evaluated as follows.

Regional Impacts

Regional air quality impacts are possible for pollutants such as ozone, which involve photochemical processes that can take hours to occur. The Project will be required to provide emissions offsets (mitigation) for ozone precursors at a 1.2 to 1.0 ratio for VOC emissions and a 1.0 to 1.0 ratio for NO_x emissions.

Although the relative importance of VOC and NO_x emissions in ozone formation differs from region to region, and from day to day, most air pollution control plans in California require roughly equivalent controls (on a ton-per-year basis) for these two pollutants. The change in emissions of the sum of these pollutants, equally weighted, will be able to provide a rough estimate of the impact of the project on ozone levels. The net change in emissions of ozone precursors from the project will be compared with emissions from all sources within Los Angeles County and the South Coast Air Basin as a whole.

Air quality impacts of fine particulate, or PM_{10}, have the potential to be either regional or localized in nature. On a regional basis, an analysis similar to that presented above for ozone will be performed, looking at the three pollutants that can form PM_{10} in the atmosphere, VOC, SO_x, and NO_x, as well as at directly emitted particulate matter. SCAQMD regulations will require offsets to be provided for PM_{10} emissions from the project at a ratio of 1.2 to 1.0. Additional mitigation may be required by the CEC.

As in the case of ozone precursors, emissions of PM_{10} precursors are expected to have approximately equivalent ambient impacts in forming PM_{10} per ton of emissions on a regional basis. A table will be provided that compares the net change in emissions of PM_{10} precursors from the project with emissions from all sources within Los Angeles County and the South Coast Air Basin as a whole.

Localized Impacts

Localized impacts from the Project could result from emissions of carbon monoxide, oxides of nitrogen, sulfur oxides, and directly emitted PM_{10}. A dispersion modeling analysis of potential cumulative air quality impacts will be performed for all four of these pollutants.

In evaluating the potential cumulative localized impacts of the Project in conjunction with the impacts of existing facilities and facilities not yet in operation but that are reasonably foreseeable, a potential impact area in which cumulative localized impacts could occur will first be identified. In order to ensure that other projects that might have significant cumulative impacts in conjunction with the project are identified, a search area with a radius of 10 km from the project site will be used for the cumulative impacts analysis.

Within this search area, three categories of projects with combustion sources will be used as criteria for identification:

- Projects that are existing and have been in operation since at least 1999.
- Projects for which air pollution permits to construct have been issued and that began operation after 1999.
- Projects for which air pollution permits to construct have not been issued, but that are reasonably foreseeable.

Projects that are existing and have been in operation since at least 1999 will be reflected in the ambient air quality data that are being used to represent background concentrations; consequently, no further analysis of the emissions from this category of facilities will be performed. The cumulative impacts analysis adds the modeled impacts of selected facilities to the maximum measured background air quality levels, thus ensuring that these existing projects are accounted for.

A list of projects for which air pollution permits to construct have been issued but that were not operational by 1999 was requested from the SCAQMD in February, 2001. The search requested information on new or modified emission sources located within 10 km of the project site that have net emission increases greater than 10 lbs/day for CO, NO_x, SO_x, or PM_{10}. Projects that satisfy this criteria and that had a permit to construct issued after January 1, 1999, will be included in the cumulative air quality impacts analysis. The January 1, 1999 date was selected based on the typical length of time a permit to construct is valid and typical project construction times to ensure that projects that are not reflected in the 1999 ambient air quality data are included in the analysis.

A list of projects within the area for which air pollution permits to construct have not yet been issued but that are reasonably foreseeable has also been requested from the SCAQMD staff.

Given the potentially wide geographic area over which the dispersion modeling analysis is to be performed, the ISCST3 model will be used to evaluate cumulative localized air quality impacts. The detailed modeling procedures, ISCST3 options, and meteorological data used in the cumulative impacts dispersion analysis will be the same as those used in the ambient air quality impacts analyses for the Project. The receptor grid will be spaced at 200 meters within 10 kilometers of the site. Receptors will be placed at 50 kilometers where cumulative modeling analysis indicates the project plus cumulative sources will have impacts that exceed the PSD significance levels.

Cumulative Impacts Dispersion Modeling

The dispersion modeling analysis of cumulative localized air quality impacts for the proposed project will be evaluated in combination with other reasonably foreseeable projects and air quality levels attributable to existing emission sources, and the impacts will be compared to state or federal air quality standards for significant impact. As discussed above, the highest second-highest modeled concentrations will be used to demonstrate compliance with standards based on short-term averaging periods (24 hours or less).

Supporting information will be provided, including the following:

- List of projects resulting from the screening analysis of permit files by the SCAQMD
- Map showing locations of sources included in the cumulative air quality impacts dispersion modeling analysis
- Stack parameters for sources included in the cumulative air quality impacts dispersion modeling analysis
- Output files for the dispersion modeling analysis.

Visual Effects Screening Analysis for
Source: Magnolia Power Station
Class I Area: Coucamonga W.A

*** User-selected Screening Scenario Results ***

Input Emissions for

Particulates	1.89	G /S
NOx (as NO2)	2.00	G /S
Primary NO2	.00	G /S
Soot	.00	G /S
Primary SO4	.00	G /S

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

Background Ozone:	.04 ppm
Background Visual Range:	246.00 km
Source-Observer Distance:	50.00 km
Min. Source-Class I Distance:	50.00 km
Max. Source-Class I Distance:	57.00 km
Plume-Source-Observer Angle:	11.25 degrees
Stability: 6	
Wind Speed: 2.00 m/s	

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	118.	57.0	51.	2.00	.780	.05	.017
SKY	140.	118.	57.0	51.	2.00	.171	.05	-.005
TERRAIN	10.	84.	50.0	84.	2.00	1.879	.05	.014
TERRAIN	140.	84.	50.0	84.	2.00	.080	.05	.001

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	0.	1.0	169.	2.00	11.096*	.05	.202*
SKY	140.	0.	1.0	169.	2.00	1.907	.05	-.059*
TERRAIN	10.	0.	1.0	169.	2.00	12.814*	.05	.134*
TERRAIN	140.	0.	1.0	169.	2.00	2.084*	.05	.045

Visual Effects Screening Analysis for
Source: Magnolia Power Station
Class I Area: San Gabrile W.A

*** User-selected Screening Scenario Results ***

Input Emissions for

Particulates	1.89	G /S
NOx (as NO2)	2.00	G /S
Primary NO2	.00	G /S
Soot	.00	G /S
Primary SO4	.00	G /S

PARTICLE CHARACTERISTICS

	Density	Diameter
Primary Part.	2.5	6
Soot	2.0	1
Sulfate	1.5	4

Transport Scenario Specifications:

Background Ozone:	.04 ppm
Background Visual Range:	246.00 km
Source-Observer Distance:	29.00 km
Min. Source-Class I Distance:	29.00 km
Max. Source-Class I Distance:	47.00 km
Plume-Source-Observer Angle:	11.25 degrees
Stability:	5
Wind Speed:	2.00 m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	152.	47.0	17.	2.00	1.047	.05	.022
SKY	140.	152.	47.0	17.	2.00	.205	.05	-.006
TERRAIN	10.	84.	29.0	84.	2.00	1.850	.05	.011
TERRAIN	140.	84.	29.0	84.	2.00	.065	.05	.001

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	0.	1.0	168.	2.00	8.855*	.05	.185*

SKY	140.	0.	1.0	168.	2.00	1.642	.05	-.054*
TERRAIN	10.	0.	1.0	168.	2.00	16.097*	.05	.153*
TERRAIN	140.	0.	1.0	168.	2.00	1.717	.05	.030

Nitrate Deposition						
Wet Deposition Factor:	**2**		Annual			24-Hour
	Maximum Annual NO_2 Concentrations	Maximum Annual HNC_3 Concentrations	Cummulative HNO3 Deposition	Maximum 24-Hour NO_2 Concentrations	Maximum 24-Hour HNO_3 Concentrations	Cummulative HNO_3 Deposition
	($\mu g/m^3$)	($\mu g/m^3$)	(kg/hectare)	($\mu g/m^3$)	($\mu g/m^3$)	(kg/hectare)
Cucamonga Wilderness Area	0.00081	0.002	0.035	0.044	0.121	0.0052
San Gabriel Wilderness Area	0.0023	0.006	0.101	0.064	0.175	0.0075
	Maximum Annual SO_2 Concentrations		Cummulative SO2 Deposition	Maximum 24-Hour SO_2 Concentrations		Cummulative SO2 Deposition
	($\mu g/m^3$)		(kg/hectare)	($\mu g/m^3$)		(kg/hectare)
		don't need this for SO2			don't need this for SO2	
Cucamonga Wilderness Area	0.000060		0.000946	0.00176		0.0000760
San Gabriel Wilderness Area	0.00019		0.00300	0.00254		0.0001097
Nitrate deposition crieteria for Class II Areas (Guidelines for Evaluating Air Pollution Impacts on Class I Wilderness						
Areas in California, page 10, USDA Forest Service Gen Tech Rep, 11/92.)			Annual 24-hour mean:	15 ppb = 28 $\mu g/m3$		
Concentrations less than 15 ppb show no injury to plant species						
		Significance level that Bill Popenuck used:3-5 kg/hectar				